Servo Drive

Servoconvertidor

Servoconversor

SCA06

User's Manual
Manual del Usuario
Manual do Usuário

User's Manual

Series: SCA06

Language: English

Document: 10001773830 / 01

Models: 4 A / 220 ... 230 V single-phase
5 A / 220 ... 230 V three-phase
8 A / 220 ... 230 V three-phase
16 A / 220 ... 230 V three-phase
24 A / 220 ... 230 V three-phase
5.3 A / 380 ... 480 V three-phase
14 A / 380 ... 480 V three-phase
30 A / 380 ... 480 V three-phase

Publishing Date: 05/2014

Summary of the Reviews

Review	Review	Chapter
0	First edition	-
1	Addition of model 30 A / 380...480 V	-

1 SAFETY INSTRUCTIONS 1-1
1.1 SAFETY WARNINGS IN THIS MANUAL 1-1
1.2 SAFETY WARNINGS IN THE PRODUCT 1-1
1.3 PRELIMINARY RECOMMENDATIONS 1-2

2 GENERAL INFORMATION 2-1
2.1 ABOUT THE MANUAL 2-1
2.2 TERMS AND DEFINITIONS USED IN THE MANUAL 2-1
2.3 ABOUT THE SCA06 2-3
2.4 IDENTIFICATION LABEL OF THE SCA06 2-5
2.5 HOW TO SPECIFY THE MODEL OF THE SCA06 2-6
2.6 RECEIVING AND STORAGE 2-7

3 INSTALLATION AND CONNECTION 3-1
3.1 MECHANICAL INSTALLATION 3-1
3.1.1 Environmental Conditions 3-1
3.1.2 Positioning and Mounting 3-1
3.2 ELECTRICAL INSTALLATION 3-6
3.2.1 Identification of the Power Terminals and Grounding Points 3-6
3.2.2 Power and Grounding Wiring, Fuses 3-8
3.2.3 Power Connections 3-11
3.2.3.1 Input Connections 3-12
3.2.3.2 Rheostatic Braking 3-13
3.2.3.2.1 Dimensioning 3-13
3.2.3.2.2 Installation of the Braking Resistor 3-13
3.2.3.2.3 Output Connections 3-15
3.2.3.3 Considerations on Grounding 3-16
3.2.4 Control Connections 3-18
3.2.4.1 Control Supply 3-18
3.2.4.2 Installation of the Battery 3-19
3.2.4.3 Control Inputs and Outputs (X1) 3-20
3.2.4.4 Position Feedback Connection (X2) 3-21
3.2.4.5 USB Port (X3) 3-22
3.2.4.6 CAN Network (X4) 3-23

4 HMI 4-1
4.1 KEYS 4-1
4.2 LEDs 4-2

5 FLASH MEMORY CARD 5-1

6 ENERGIZING AND START OF OPERATION 6-1
6.1 PREPARATION AND ENERGIZING 6-1
6.2 PROGRAMMING AND OPERATION 6-1
6.2.1 Example 1: Operation in Speed Mode with Reference via Parameter 6-2
6.2.1.1 Adjustment of the Password in P00000 6-3
6.2.1.2 Programming of the Motor to Be Used 6-4
6.2.1.3 Speed Control and Enabling via Parameter 6-5
6.2.2 Example 2: Operation in Speed Mode - Using Accessory EAN 1 - With Position Control Done by External Device (CNC, for example) 6-6
6.2.3 Example 3: Operation Using Ladder Programming 6-7

7 TROUBLESHOOTING AND MAINTENANCE 7-1
7.1 OPERATION OF FAULTS AND ALARMS 7-1
7.2 ALARMS, FAULTS AND POSSIBLE CAUSES 7-1
7.3 TROUBLESHOOTING MOST COMMON PROBLEMS 7-2
7.4 BATTERY REPLACEMENT 7-2
7.5 TECHNICAL ASSISTANCE CONTACT INFORMATION 7-4
7.6 PREVENTIVE MAINTENANCE 7-4
7.6.1 Cleaning Instructions 7-5

8 OPTIONAL ITEMS AND ACCESSORIES 8-1
8.1 OPTIONAL ITEMS 8-1
8.1.1 Internal RFI filter 8-1
8.1.2 Internal Control Supply 8-2
8.2 ACCESSORIES 8-2
8.2.1 ECO1 8-3
8.2.2 EAN1 8-3
8.2.3 EIO1 8-4
8.2.4 EEN1 8-4
8.2.5 EEN2 8-4
8.2.6 ECO3 8-5
8.3 PERIPHERALS 8-5
8.3.1 Servomotor 8-5
8.3.2 Cables for Servomotors 8-18
8.3.3 Braking Resistor RF200 8-27
8.3.4 External RFI Filter 8-27
8.3.5 Autotransformer 8-28

9 TECHNICAL SPECIFICATIONS 9-1
9.1 POWER DATA 9-1
9.2 ELECTRONICS/GENERAL DATA 9-2
9.2.1 Standards Met 9-3
9.3 MECHANICAL DATA 9-4

1 SAFETY INSTRUCTIONS

This manual contains information necessary for the correct use of the servo drive SCA06.

It was developed to be used by people with proper technical training or qualification to operate this kind of equipment.

This manual contains all the functions and parameters of the SCA06, but it is not intended to present every possible application of the SCA06. WEG will not take any liabilities for applications not described in this manual.

This product is not intended for applications whose purpose is to ensure physical integrity and/or life of people, or for any other application in which a fault of the SCA06 may create a situation of risk to the physical integrity and/or life of people. The engineer who applies the SCA06 must provide ways to ensure the safety of the installation even in case of a failure of the servo drive.

1.1 SAFETY WARNINGS IN THIS MANUAL

In this manual, the following safety warnings are used:

DANGER!
The procedures recommended in this warning have the purpose of protecting the user against death, serious injuries and considerable material damage.

DANGER!
Les procédures concernées par cet avertissement sont destinées à protéger l'utilisateur contre des dangers mortels, des blessures et des détériorations matérielles importantes.

ATTENTION!
The procedures recommended in this warning aim at preventing material damages.

NOTE!
The text aims at providing important information for the full understanding and proper operation of the product.

1.2 SAFETY WARNINGS IN THE PRODUCT

The following symbols are fixed to the product, as a safety warning:

High voltages present.

Component parts sensitive to electrostatic discharges.
Do not touch them.

Mandatory connection to the protective earth (PE).

Connection of the shield to the grounding.

Hot surface.

1.3 PRELIMINARY RECOMMENDATIONS

DANGER!
Only trained personnel, with proper qualifications, and familiar with the SCA06 servo drive and associated machinery shall plan and implent the installation, starting, operation, and maintenance of this equipment.
The personnel shall follow all the safety instructions described in this manual and/or defined by the local regulations.
Failure to comply with the safety instructions may result in death, serious injury, and equipment damage.

DANGER!
Seulement personnes avec la qualification adéquate et familiarisation avec le SCA06 et équipements associés doivent planifiquer ou implementer l'installation, mise en marche, operation et entretien de cet équipement.
Cettes personnes doivent suivre toutes les instructions de sécurités indiquées dans ce manuel, et/ou définies par normes locales.
L'inobservance des instructions de sécurité peut résulter en risque de vie et/ou dommages de cet équipement.

NOTE!
For the purposes of this manual, qualified personnel are those trained in order to be able to:
1. Install, ground, power up and operate the SCA06 in accordance with this manual and the safety legal procedures in force.
2. Use the protective equipment in accordance with the relevant standards.
3. Give first aid.

DANGER!
Always disconnect the main power supply before touching any electrical device associated with the servo drive.
Several components may remain charged with high voltage and/or in movement (fans), even after the AC power supply has been disconnected or turned off.
Wait at least 10 minutes to guarantee the fully discharge of capacitors.
Always connect the equipment frame to the ground protection (PE).

DANGER!
Débranchez toujours l'alimentation principale avant d'entrer en contact avec un appareil électrique associé au variateur. Plusieurs composants peuvent rester chargés à un potentiel électrique élevé et/ou être en mouvement (ventilateurs), même après la déconnexion ou la coupure de l'alimentation en courant alternatif.
Attendez au moins 10 minutes que les condensateurs se déchargent complètement.
Raccordez toujours la masse de l'appareil à une terre protectrice (PE).

ATTENTION!
The electronic cards have components sensitive to electrostatic discharges. Do not touch directly the component parts or connectors. If necessary, first touch the grounded metallic frame or use a proper grounding strap.

Do not carry out any applied potential test in the servo drive!
If necessary, contact WEG.

NOTE!
Servo drives may interfere in other electronic equipment. Follow the recommended procedures to minimize those effects.

NOTE!
Read the user's manual completely before installing or operating the servo drive.

ATTENTION!
The operation of this equipment requires detailed installation and operation instructions provided in the user's manual, programming manual and manuals/guides for kits and accessories. Only the user's manual is supplied in print. The other manuals are in the CD that comes with the product. Such CD must always be kept with the SCA06.

2 GENERAL INFORMATION

2.1 ABOUT THE MANUAL

This manual presents the main technical characteristics, procedures for the installation and commissioning, and instructions for the troubleshooting of the most common problems of servo drives of the line SCA06.

For further details about the commissioning, parameterization and programming, refer to the programming manual.

For information on other functions, accessories and operating conditions, refer to the following manuals:

- Programming manual with detailed description of the parameters and advanced functions of the servo drive SCA06.
- CANopen communication manual.
- Online Help included in the WLP software.
- Accessories manuals.

The accessory manuals are provided with them. However, all manuals are available for download on WEG website - www.weg.net.

2.2 TERMS AND DEFINITIONS USED IN THE MANUAL

A: amperes.

DC Busbar (DC Link): intermediary circuit of the servo drive; voltage in direct current obtained by rectifying the power supply alternate voltage or by external supply; it supplies the output inverter bridge formed by the IGBTs.

U, V and W leg: set of two IGBTs of the servo drive output phases U, V and W.

°C: celsius degree.

°F: fahrenheit degree.

AC: alternate current.

DC: direct current.

CFM: cubic feet per minute.

Pre-Charge Circuit: it charges the capacitors of the DC busbar with limited current, preventing greater current peaks at the energizing of the servo drive.

HP: horsepower = 746 Watts; Power measurement unit, normally used to indicate the mechanical power of electric motors.

Heatsink: metal part designed to dissipate the heat produced by power semiconductors.

RFI Filter: radio Frequency Interference Filter - Filter to reduce interference in the radio frequency band.

Switching Frequency: commutating frequency of the IGBTs of the inverter bridge, normally expressed in kHz.

ft: foot - unit of length equivalent to 304.8 mm.

HMI: human machine interface; device that allows viewing and changing the parameters, alarms and faults of the servo drive. It features navigation keys and LED display.

Hz: hertz.

IGBT: Insulated Gate Bipolar Transistor - basic component part of the output inverter bridge. It works as an electronic switch in the saturated (closed switch) and cut-off (open switch) modes.

Braking IGBT: it works as a switch to turn on the braking resistor. It is automatically controlled by the DC busbar level.

in: inch, unit of length equivalent to 25.4 mm.

kg: kilogram = 1000 grams.

kHz: kilohertz = 1000 hertz.

mA: milliampere = 0.001 ampere.

MC: Motion Control.

FLASH Memory: non-volatile memory that may be electrically written and erased.

RAM Memory: random access memory. Characterized for being volatile, that is, it loses the data when the servo drive is shut down.

min: minute.

mm: millimeter, unit of length equivalent to 0.039 inch

ms: millisecond = 0.001 second.

N.m: newton meter; unit of torque.

NTC: resistor whose resistance value in Ohms decreases proportionally to the increase of the temperature; used as temperature sensor in power packs.

PE: protective earth.

PTC: resistor whose resistance value in Ohms increases proportionally to the temperature; used as temperature sensor in servomotors.

PWM: pulse width modulation - modulation by pulse width; pulsed voltage that supplies the servomotor.

Rectifier: input circuit of the servo drives that transforms the input AC voltage into DC. It is formed by high-power diodes.

RMS: root mean square - effective value.

rpm: revolutions per minute.

s: second.

USB: universal serial bus - type of serial communication interface designed to operate according to the plug-and-play concept.

V: volts.

Ω: ohms.

2.3 ABOUT THE SCA06

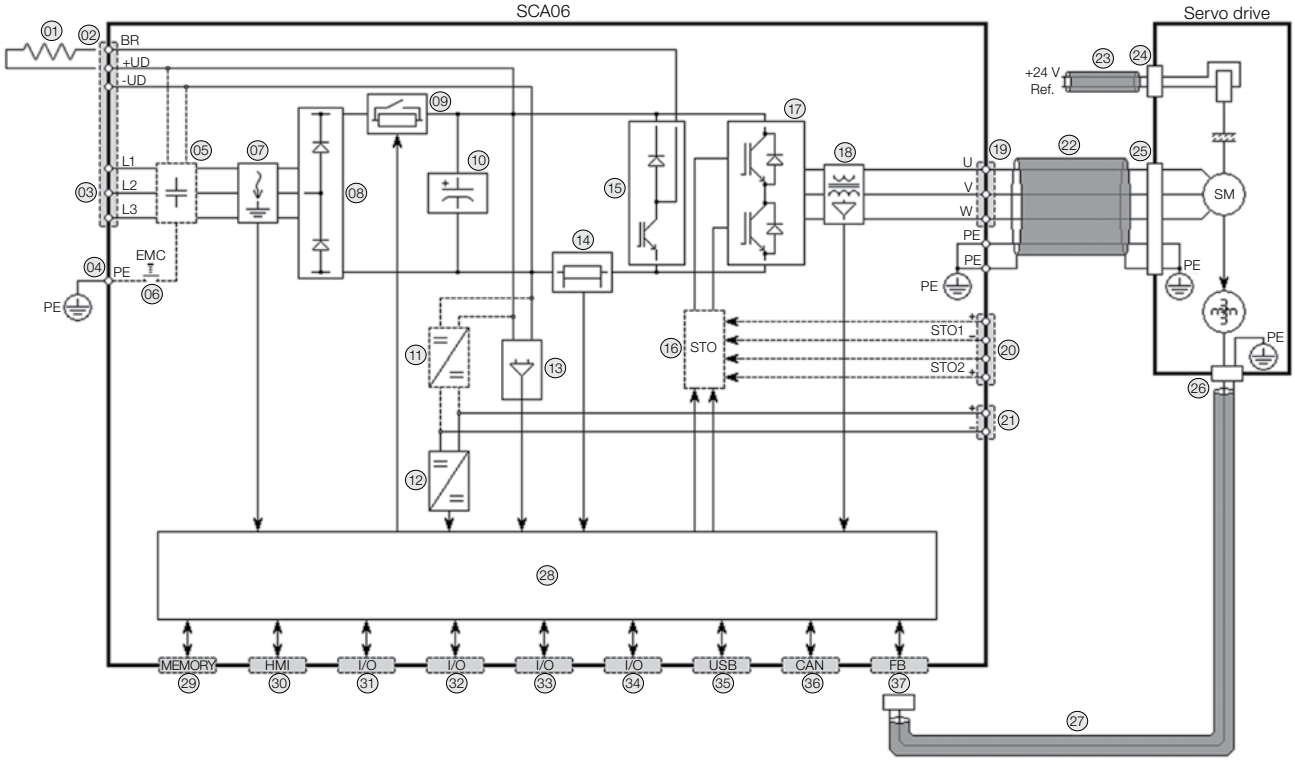
The servo drive SCA06 is a high-performance product which allows controlling the speed, torque and position of three-phase, sine-wave, alternate current servomotors. The main characteristic of this product is the high performance and high precision of movement control of the servomotor shaft due to the operation in closed loop by means of the position feedback given by a sensor inside the servomotor.

The SCA06 features independent control and power supply, allowing, for instance, that the product communication networks keep on working normally even if the power circuit must be turned off for some reason.

The use of braking resistors provides greatly reduced braking times, optimizing the processes that require high performance.

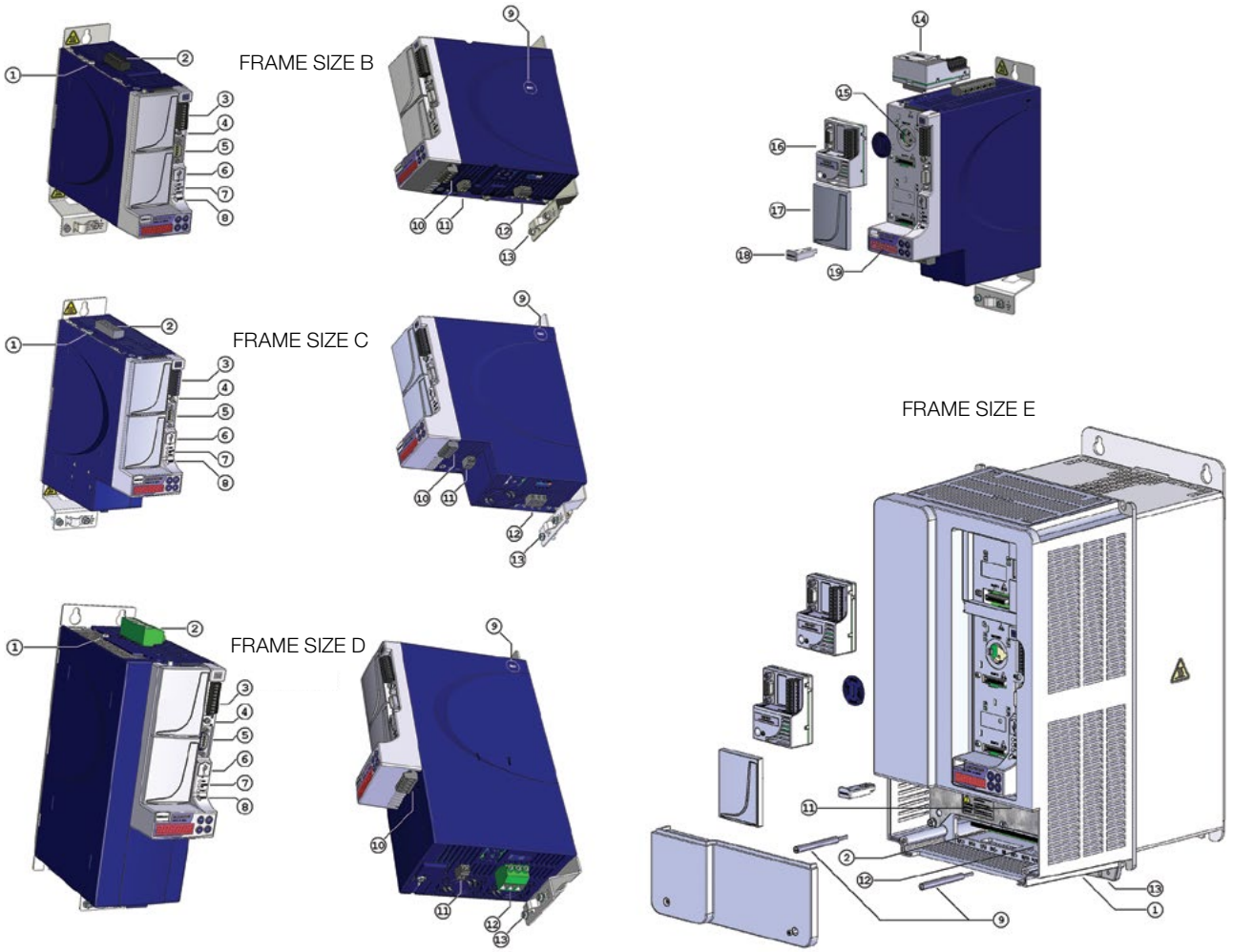
Several special functions are available, such as programming in ladder with positioning blocks, which provides extreme flexibility and integration to the drive.

The SCA06 can be used in different applications with many options of cables, both for simple applications and complex applications like handling, environments with oil, etc.



1 – Braking resistor
2 – Power supply connector (X9)
3 – Power supply
4 – Servo drive grounding
5 – RFI filter card (optional)
6 – RFI filter disconnection
7 – Ground fault detection
8 – Rectifier
9 – Pre-load
10 – DC link
11 – Internal source (optional)
12 – Power supply
13 – Voltage feedback
14 – Overcurrent protection
15 – Braking chopper
16 – Safe torque off card (optional)
17 – IGBT bridge
18 – Current feedback
19 – Output connector for servomotor (X8)
20 – STO control connector (X7)
21 – Control supply connector (X5)
22 – Servomotor power cable
23 – Control cable of the servomotor brake
24 – Control connector of the servomotor brake
25 – Servomotor power connector
26 – Servomotor feedback connector
27 – Servomotor feedback cable
28 – Control card
29 – Flash memory card.
30 – Man machine interface
31 – Connector for accessory (Slot 1)
32 – Connector for accessory (Slot 2)
33 – Connector for accessory (Slot 3)
34 – Input/output connector (X1)
35 – USB communication network (X3)
36 – CAN communication network (X4)
37 – Feedback connector (X2)

Figure 2.1: *Block diagram of the SCA06*

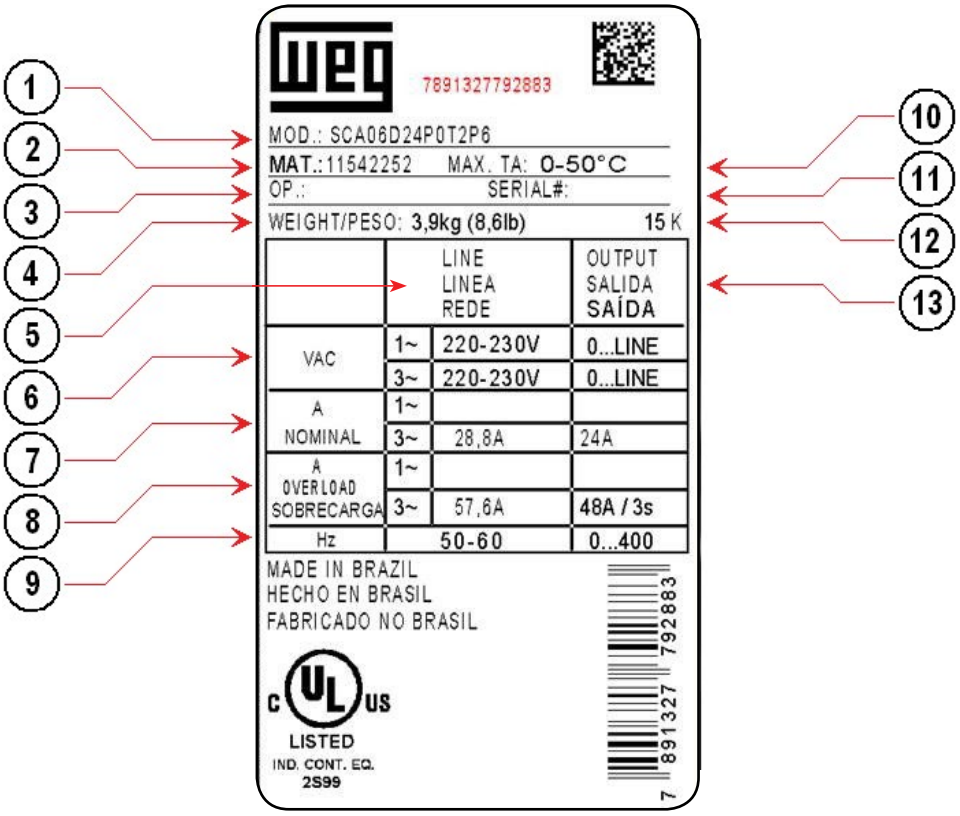


1 – Servo drive protective earth (PE)
2 – Power supply (X9)
3 – Standard I/Os (X1)
4 – Shield grounding for analog input signal cable
5 – Position feedback (X2)
6 – USB network (X3)
7 – Status LEDs
8 – Reset
9 – RFI filter disconnection
10 – CAN network (X4)
11 – Electronics supply (X5)
12 – Servomotor connection (X8)
13 – Servomotor protective earth (PE)
14 – Module for accessories (sold separately)
15 – Battery
16 – Module for accessories (sold separately)
17 – Blind cover
18 – Flash memory card (FMC)
19 – Human machine interface (HMI)

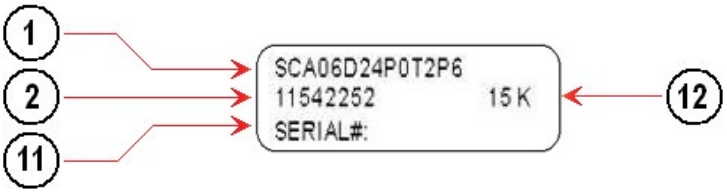
Figure 2.2: *Servo drive SCA06*

2.4 IDENTIFICATION LABEL OF THE SCA06

There are two identification labels: a complete one, located on the side of the servo drive and another summarized, under the accessories or cover right above the HMI. The latter allows identifying the most important characteristics even in servo drives mounted side by side.



(a) Identification label on the side of the servo drive

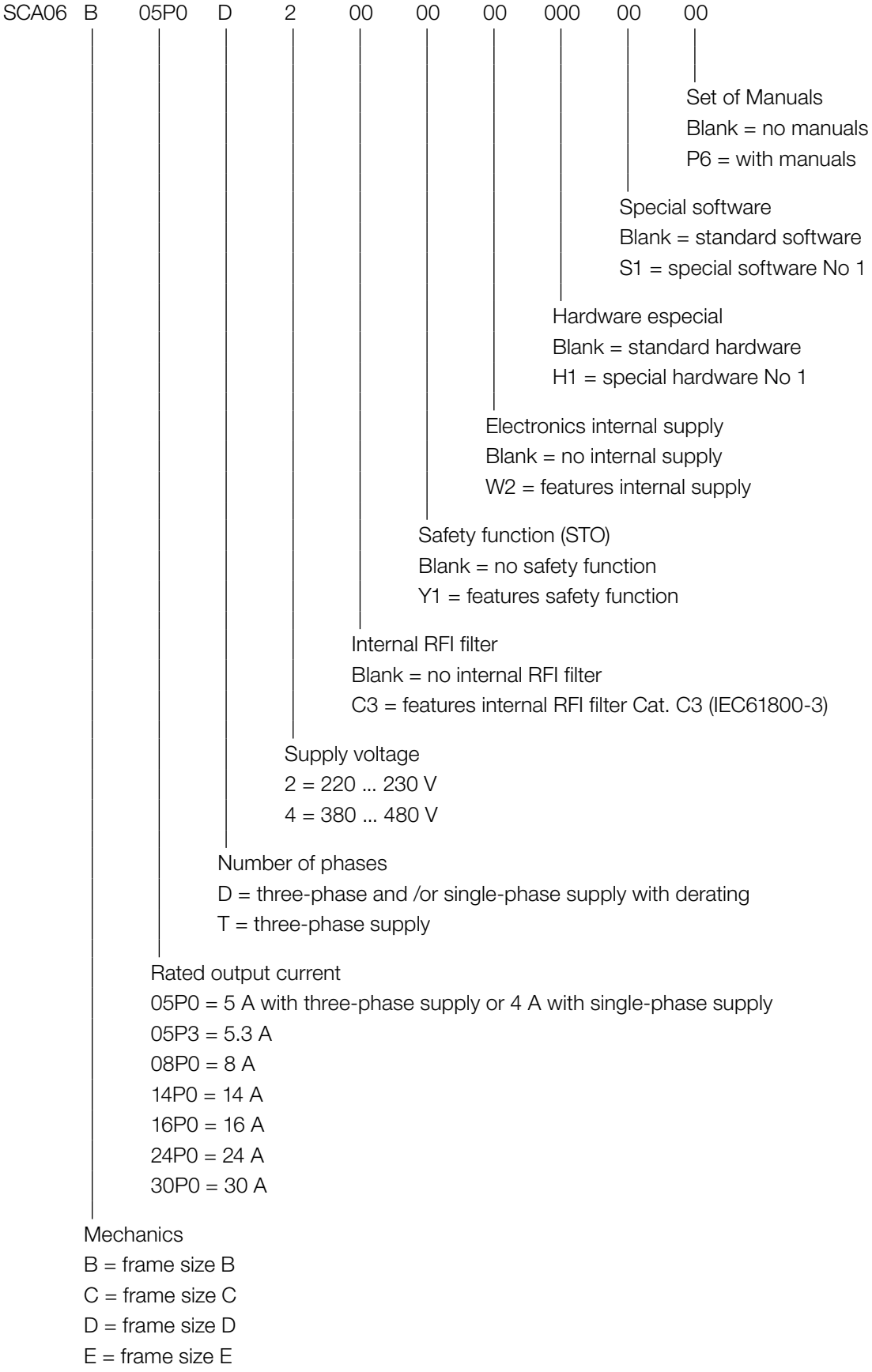


(b) Identification label above the HMI

1 – SCA06 model
2 – WEG stock item
3 – WEG production order
4 – Servo drive net weight
5 – Column of input rated data
6 – Voltage
7 – Rated current
8 – Overload current
9 – Frequency
10 – Maximum ambient temperature around the SCA06
11 – Serial number
12 – Manufacturing date (15 corresponds to week and k to year)
13 – Column of output rated data

Figure 2.3: *(a) and (b) Identification labels*

2.5 HOW TO SPECIFY THE MODEL OF THE SCA06


SCA06 B 05P0 D 2 00 00 00 000 00 00
Set of Manuals
Blank = no manuals
P6 = with manuals
Special software
Blank = standard software
S1 = special software No 1
Hardware especial
Blank = standard hardware
H1 = special hardware No 1
Electronics internal supply
Blank = no internal supply
W2 = features internal supply
Safety function (STO)
Blank = no safety function
Y1 = features safety function
Internal RFI filter
Blank = no internal RFI filter
C3 = features internal RFI filter Cat. C3 (IEC61800-3)
Supply voltage
2 = 220 ... 230 V
4 = 380 ... 480 V
Number of phases
D = three-phase and /or single-phase supply with derating
T = three-phase supply
Rated output current
05P0 = 5 A with three-phase supply or 4 A with single-phase supply
05P3 = 5.3 A
08P0 = 8 A
14P0 = 14 A
16P0 = 16 A
24P0 = 24 A
30P0 = 30 A
Mechanics
B = frame size B
C = frame size C
D = frame size D
E = frame size E

For details of each available model, refer to Table 9.1 on page 9-1.

2.6 RECEIVING AND STORAGE

The SCA06 is supplied packed in a cardboard box. In the external part of this package, there is an identification label identical to the one attached to the side of the SCA06.

At the receipt of the product, check:

- If the identification label of the SCA06 corresponds to the purchased model.
- Any damages occurred during transportation.
- Report any damages immediately to the carrier.

If the SCA06 is not installed soon, store it in a clean and dry location (temperature between -25 °C (-13 °F) and 60 °C (140 °F)), with a cover to prevent dust accumulation inside it.

ATTENTION!
When the inverter is stored for long periods, it becomes necessary to perform the capacitor reforming. Refer to the procedure in Table 7.2 on page 7-5.

3 INSTALLATION AND CONNECTION

This chapter describes the electric and mechanical installation procedure of the SCA06. The directions and suggestions must be observed so as to ensure the safety of people, equipment and proper operation of the servo drive.

3.1 MECHANICAL INSTALLATION

3.1.1 Environmental Conditions

Avoid:

- Direct exposure to sunlight, rain, high humidity or sea-air.
- Inflammable or corrosive liquids or gases.
- Excessive vibration.
- Dust, metallic particles or oil mist.

Environment conditions permitted for the operation of the inverter:

- Ambient temperature: 0 ºC (32 °F) to 50 ºC (122 °F) - rated conditions (measured around the servo drive).
- From 50 ºC (122 °F) to 60 ºC(140 °F) - 2 % of current derating for each Celsius degree above 50 ºC (122°F).
- Air relative humidity: 5 % to 90 % non-condensing.
- Maximum altitude: up to 1000 m (3280 ft)- rated conditions.
- 1000 m (3280 ft) to 4000 m (13123 ft) - 1 % of current derating for each 100 m (328 ft) above 1000 m (3280 ft) of altitude.
- Pollution degree: 2 (according to EN50178 and UL508C), with non-conductive pollution. Condensation must not originate conduction through the accumulated residues.

3.1.2 Positioning and Mounting

Check the weight of the servo drive in Table 9.1 on page 9-1 or in the product label.

Install the servo drive in the vertical position on a flat surface, preferably on a galvanized and grounded plate.

Check the external dimensions and position of the fixation holes in Figure 3.1 on page 3-3. For further details, refer to section 9.3 MECHANICAL DATA on page 9-4.

Put the first bolt on the surface where the servo drive will be installed, install the servo drive and then tighten the bolt.

Allow the minimum clearances indicated in Figure 3.2 on page 3-5 so as to allow the cooling air circulation.

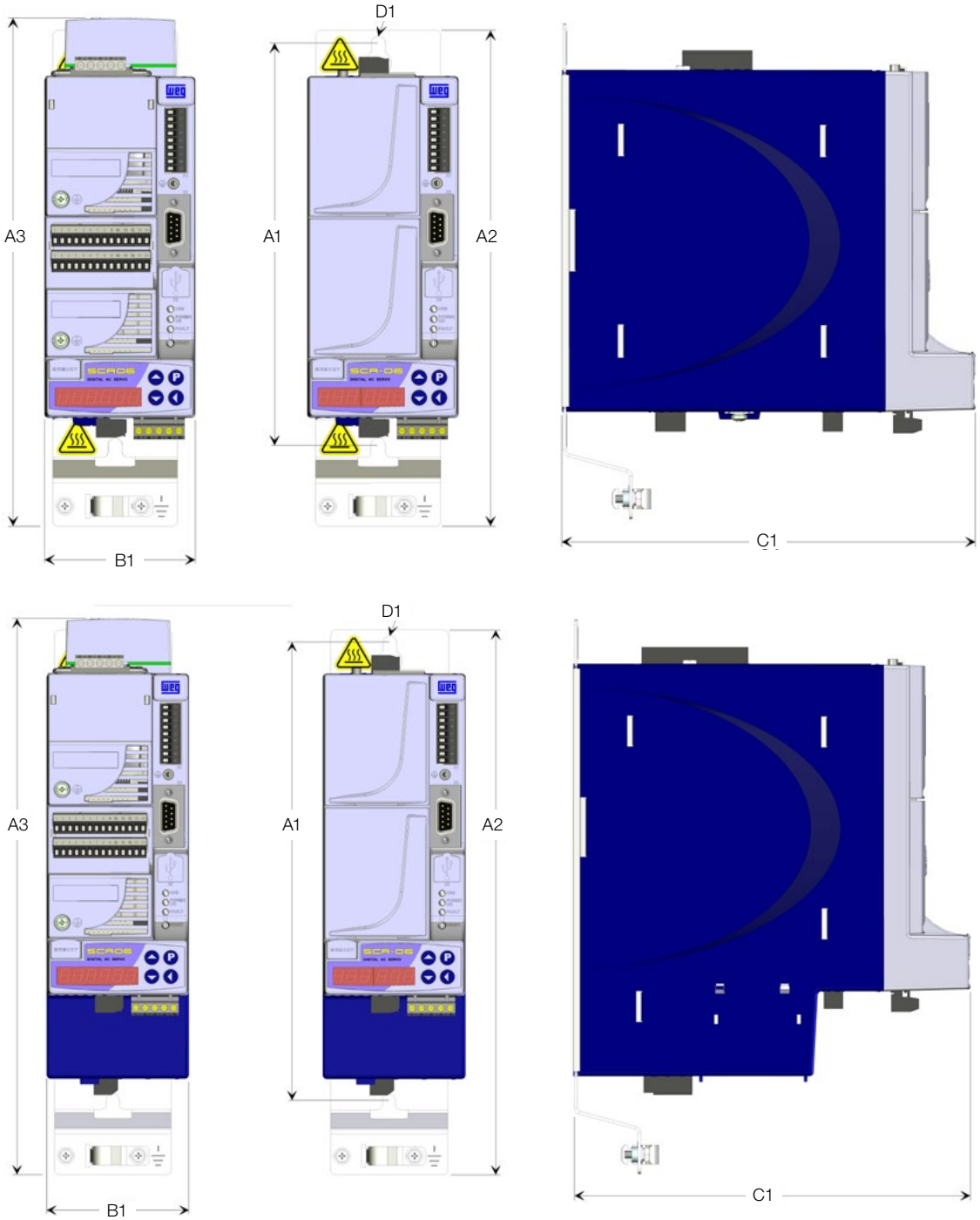
It is possible to mount the servo drives side by side without side clearances.

Do not put sensitive component parts right above the servo drive.

ATTENTION!
When one servo drive is installed above another, use the minimum distance B1 + C1 (Figure 3.2 on page 3-5) and deviate the hot air coming from the servo drive below from the one mounted above.

If the mounting is inside a panel, provide proper ventilation so that the internal temperature remains within the allowed range for the operating conditions of the servo drive.
The power dissipated by the servo drive at rated condition is specified in Table 9.1 on page 9-1.

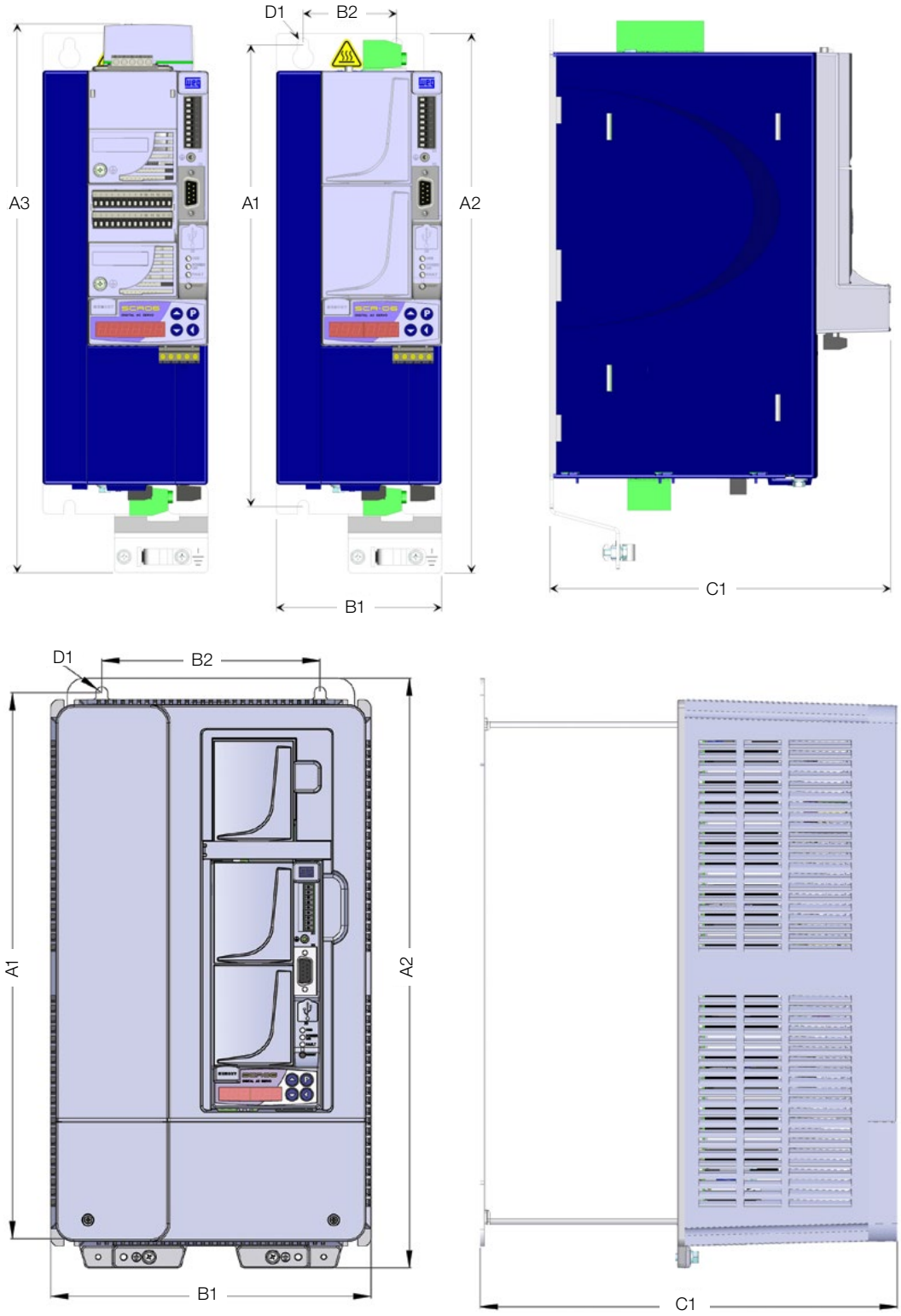
ATTENTION!
Provide independent conduits or gutters for the physical separation of signal, control, and power cables (refer to section 3.2 ELECTRICAL INSTALLATION on page 3-6).



Model	A1 mm (in)	A2 mm (in)	A3 mm (in)	B1 mm (in)	C1 mm (in)	D1 M	Torque (*) N.m (lbf.in)
Frame size B	200 (7.87)	247 (9.72)	253 (9.96)	75 (2.95)	206.7 (8.14)	M5	5 (44.2)
Frame size C	242 (9.53)	288 (11.34)	294 (11.57)	75 (2.95)	206.7 (8.14)	M5	5 (44.2)

Tolerance of the dimensions: ±1 mm (±0.039 in).
(*) Torque recommended to fix the servo drive (valid for D1).

(a) Frame sizes B and C



Model	A1	A2	A3	B1	B2	C1	D1	Torque (*)
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	M	N.m (lbf.in)
Frame size D	288 (11.34)	336 (13.23)	342 (13.46)	103 (4.06)	58 (2.28)	206.7 (8.14)	M5	5 (44.2)
Frame size E	375 (14.76)	405 (15.94)	- -	220 (8.66)	150 (5.91)	286.5 (11.28)	M6	8.5 (75.2)

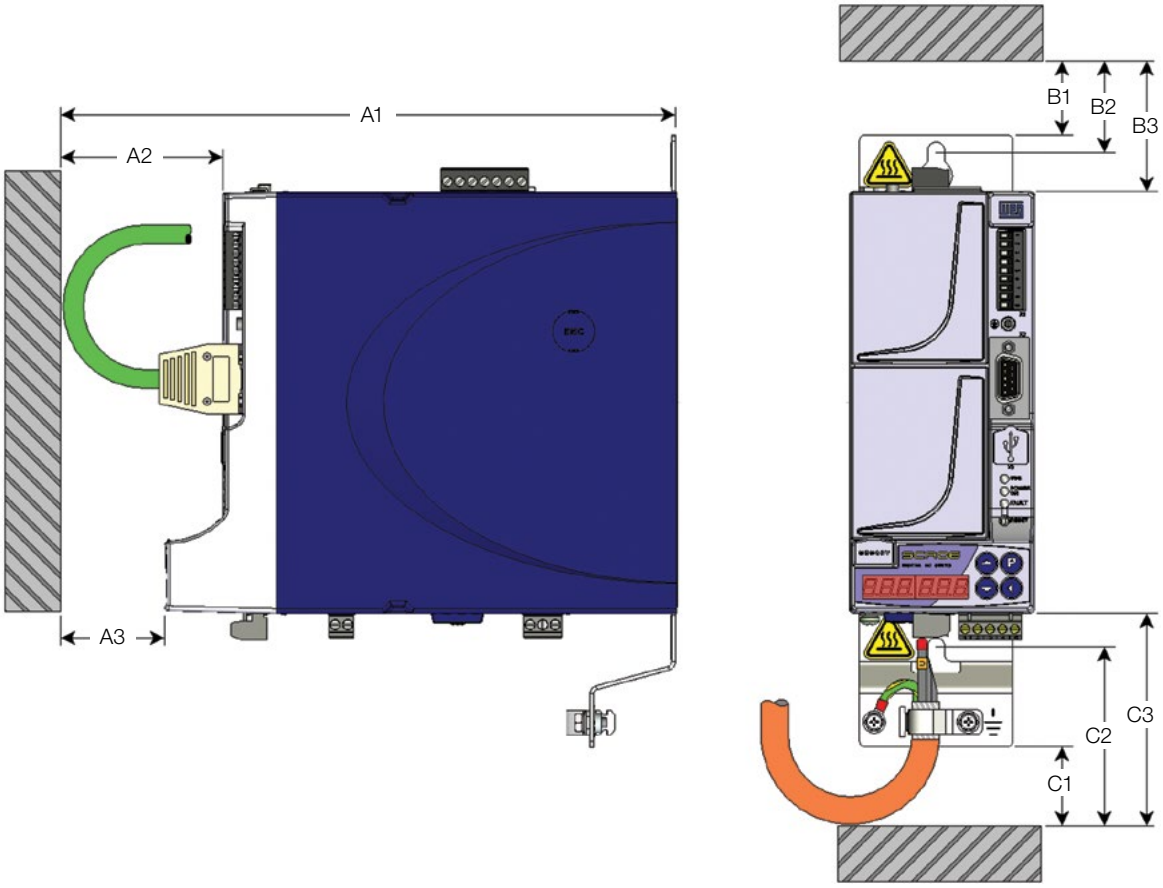
Tolerance of the dimensions: ±1 mm (±0.039 in).

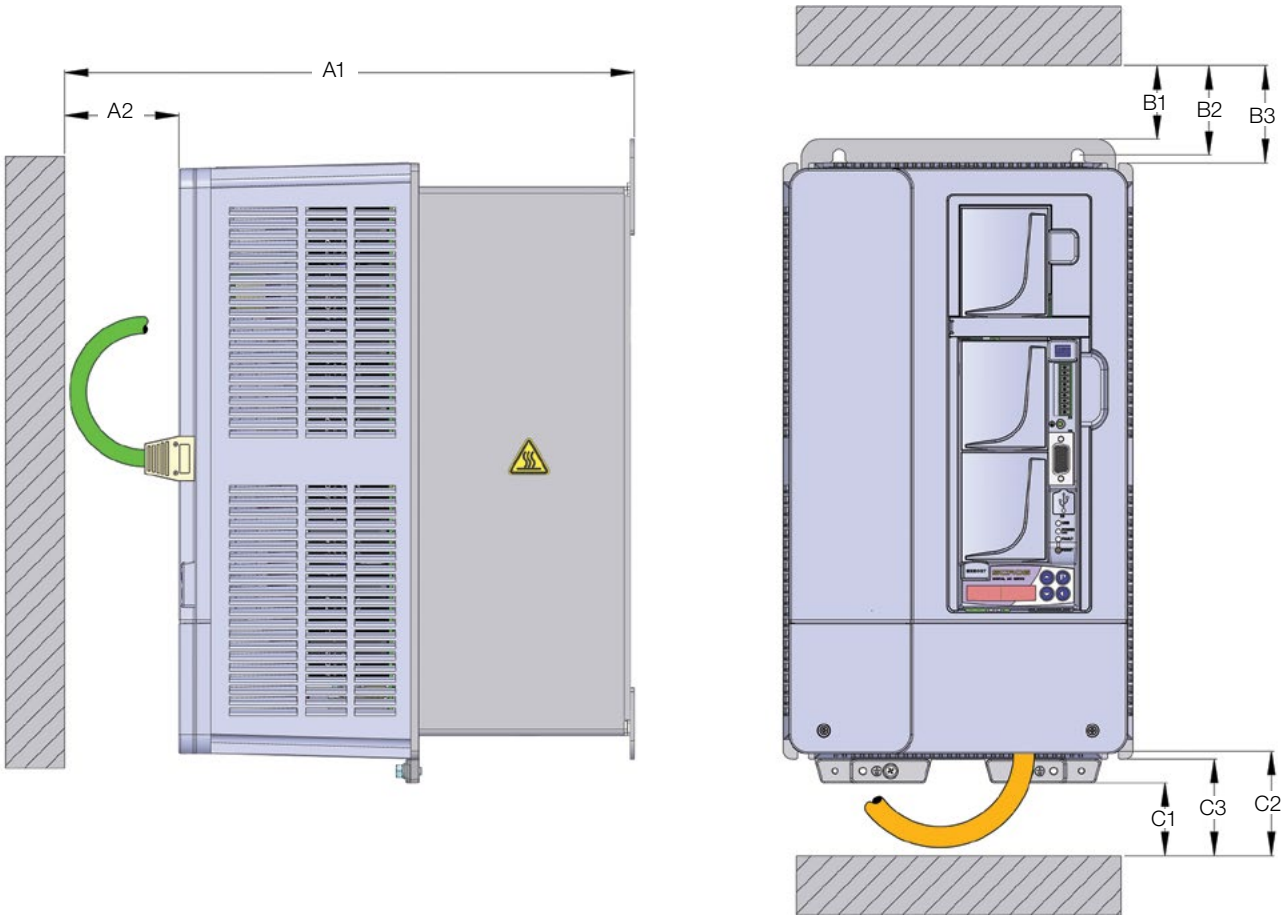
(*) Torque recommended to fix the servo drive (valid for D1).

(b) Frame sizes D and E

Figure 3.1: *(a) and (b) Data for mechanical installation*

NOTE!
For further details refer to section 9.3 MECHANICAL DATA on page 9-4.





Model	A1	A2	A3	B1	B2	B3	C1	C2	C3
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
Frame size B	272.4 (10.72)	90.0 (3.54)	66.5 (2.62)	77.0 (3.03)	83.5 (3.29)	100.0 (3.94)	50.0 / 130.0 (*) (1.97 / 5.12 (*))	90.5 / 170.5 (*) (3.56 / 6.71 (*))	104.0 / 184.0 (*) (4.09 / 7.24 (*))
Frame size C							60.0 / 130.0 (*) (2.36 / 5.12 (*))	100.5 / 170.5 (*) (3.96 / 6.71 (*))	114.0 / 184.0 (*) (4.49 / 7.24 (*))
Frame size D							70.0 / 160.0 (*) (2.76 / 6.30 (*))	110.5 / 200.5 (*) (4.35 / 7.89 (*))	124.0 / 214.0 (*) (4.88 / 8.43 (*))
Frame size E			- -	95.0 (3.74)	105.0 (4.33)	110.0 (4.33)	115.0 / 170.0 (*) (4.53 / 6.69 (*))	135.0 / 190.0 (*) (5.31 / 7.48 (*))	130.0 / 185.0 (*) (5.12 / 7.28 (*))

(*) Cable for flexing. Refer to item 8.3.2 Cables for Servomotors on page 8-18.

Figure 3.2: *Clearances for ventilation and cables*

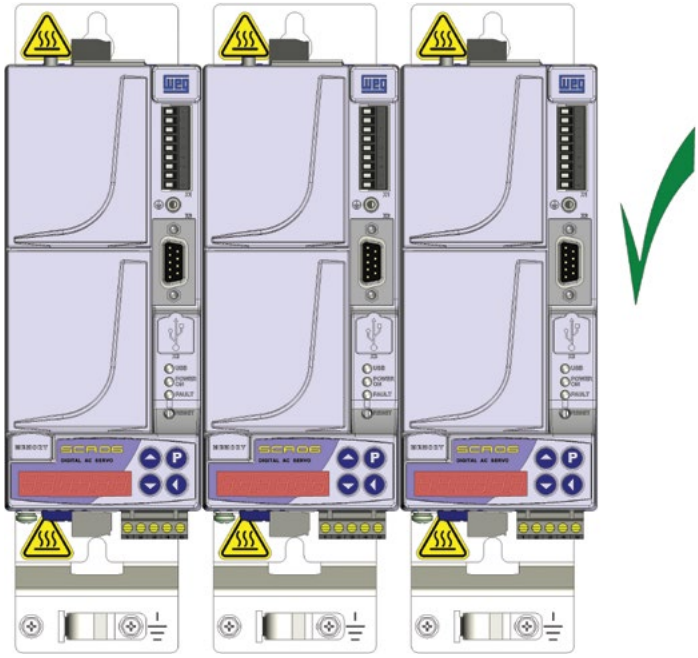


Figure 3.3: Side by side mounting without side clearance

3.2 ELECTRICAL INSTALLATION

DANGER!
The following information is merely a guide for proper installation. Comply with applicable local regulations for electrical installations.

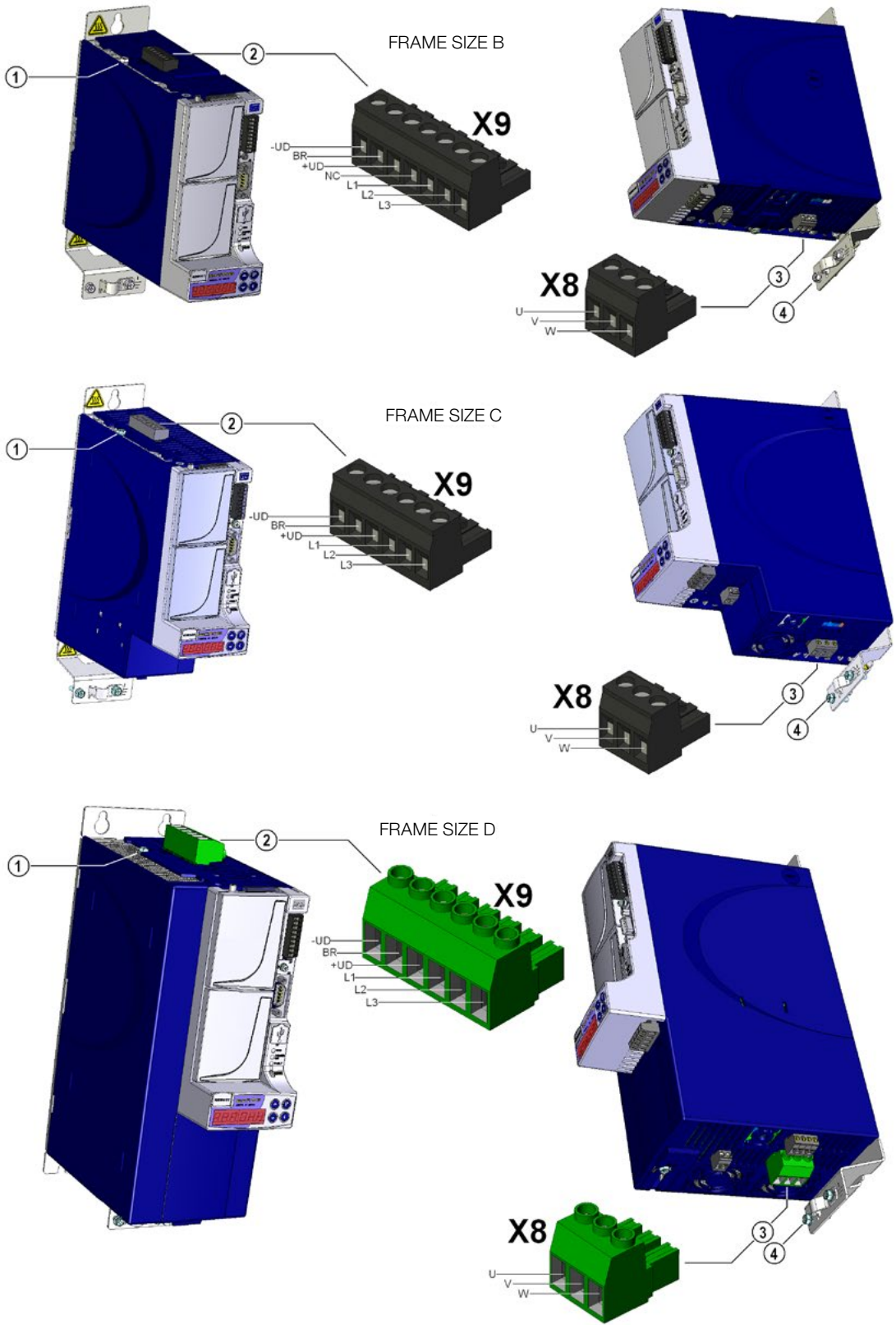
DANGER!
Les informations suivantes constituent uniquement un guide pour une installation correcte. Respectez les réglementations locales en vigueur pour les installations électriques.

DANGER!
Make sure the AC power supply is disconnected before starting the installation.

DANGER!
Vérifiez que l'alimentation secteur CA est débranchée avant de commencer l'installation.

3.2.1 Identification of the Power Terminals and Grounding Points

NOTE!
The model SCA06B05P0D2 can operate normally with three phases or with two phases (single-phase supply) with a derating from 5 A to 4 A of the rated output current. The AC supply voltage, in this case, may be connected to two of any input terminals (L1, L2 or L3). Whenever the SCA06B05P0D2 operates with single-phase supply, the P00217 parameter must be reprogrammed.



1 - Grounding (network PE)

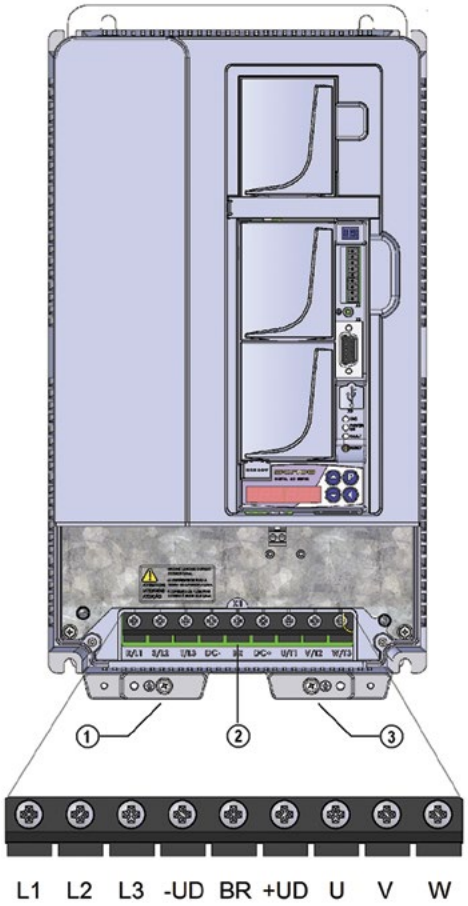
2 - Supply and braking connector (X9)
-UD: Negative pole of the DC busbar voltage
BR: Braking resistor connection
+UD: Positive pole of the DC busbar voltage
NC: Not connected
L1: Power supply AC
L2: Power supply AC
L3: Power supply AC

3 - Motor connector(X8)
U: Phase U
V: Phase V
W: Phase W

4 - Grounding (motor PE)

(a) Frame sizes B, C and D

FRAME SIZE E



1 – Grounding (Mains PE)

2 – Motor and braking and power supply connector
L1 (R), L2 (S), L3 (T): AC power supply
-UD (DC-): negative pole of the DC link voltage
BR: connection of the braking resistor
+UD (DC+): positive pole of the DC link voltage.
U (T1), V (T2), W (T3): connections to the motor

3 – Grounding (motor PE)

(b) Frame size E

Figure 3.4: *(a) and (b) Power and grounding terminals*

3.2.2 Power and Grounding Wiring, Fuses

ATTENTION!
When flexible cables are used for the power and grounding connections, proper terminals must be used.

ATTENTION!
Sensitive equipment, such as PLCs, temperature controllers and thermocouple cables must be placed at least 0.25 m (0.82 ft) away from the servo drives and from the cables between the servo drive and the servomotor.

DANGER!
Wrong cable connection:
- The inverter will be damaged if the power supply is connected to the output terminals (U/T1, V/T2, or W/T3).
- Check all the connections before powering up the inverter.
- When replacing an existing inverter by a SCA06, check if the installation and wiring is according to the instructions listed in this manual.

DANGER!
Mauvaise connexion des câbles:
- Le variateur sera endommagé si l'alimentation d'entrée est connectée aux bornes de sortie (U/T1, V/T2 ou W/T3).
- Vérifier toutes les connexions avant de mettre le variateur sous tension.
- En cas de remplacement d'un variateur existant par un SCA06, vérifier si l'installation et le câblage sont conformes aux instructions figurant dans ce manuel.

ATTENTION!
Residual differential interrupter (DR):
- When used in the supply of the servo drive, it must present pick-up current of at least 300 mA.
- Depending of the installation conditions, such as cable length and type of the servomotor, etc., the DR interrupter may actuate. Check with the manufacturer the most suitable one for operation with servo drives.
- Check the item 8.3.4 External RFI Filter on page 8-27.

Table 3.1: Recommended wiring / fuses

Model	Frame Size	Power terminal			Wiring (**)			WEG Ultrafast Fuse (A)	I²t of the Fuse (A²s)@25°C	WEG Circuit Breaker
		Terminals	Screw (type)	Recommended Torque N.m (lbf.in)	mm²	AWG	Terminals			
SCA06B05P0D2	B	(PE)	M4 (Philips)	1.8 (15.6)	2.5	12	Ring type	20 A (10687494)	<300	MDW-C16-2(1Ø) MDW-C10-3(3Ø)
		L1, L2 and L3	M3 (slot)	0.51 (4.5)	2.5 (1Ø) (*) 1.5 (3Ø)	12 (1Ø) (*) 14 (3Ø)	Ferrule type			
		U, V and W	M3 (slot)	0.51 (4.5)	According to the motor	According to the motor	Ferrule type			
		(Motor PE)	M4 (Philips)	1.8 (15.6)	According to the motor	According to the motor	Ring type			
SCA06C08P0T2	C	(PE)	M4 (Philips)	1.8 (15.6)	2.5	12	Ring type	20 A (10687494)	<300	MDW-C16-3
		L1, L2 and L3	M3 (slot)	0.51 (4.5)	2.5	12	Ferrule type			
		U, V and W	M3 (slot)	0.51 (4.5)	According to the motor	According to the motor	Ferrule type			
		(Motor PE)	M4 (Philips)	1.8 (15.6)	According to the motor	According to the motor	Ring type			
SCA06D16P0T2	D	(PE)	M4 (Philips)	1.8 (15.6)	4.0	10	Ring type	35 A (10701721)	<1700	MDW-C32-3
		L1, L2 and L3	M4 (slot/Philips)	2.35 (20.8)	4.0	10	Ferrule type			
		U, V and W	M4 (slot/Philips)	2.35 (20.8)	According to the motor	According to the motor	Ferrule type			
		(Motor PE)	M4 (Philips)	1.8 (15.6)	According to the motor	According to the motor	Ring type			
SCA06D24P0T2	D	(PE)	M4 (Philips)	1.8 (15.6)	4.0	10	Ring type	50 A (10701718)	<1700	MDW-C50-3
		L1, L2 and L3	M4 (slot/Philips)	2.35 (20.8)	4.0	10	Ferrule type			
		U, V and W	M4 (slot/Philips)	2.35 (20.8)	According to the motor	According to the motor	Ferrule type			
		(Motor PE)	M4 (Philips)	1.8 (15.6)	According to the motor	According to the motor	Ring type			
SCA06C05P3T4	C	(PE)	M4 (Philips)	1.8 (15.6)	1.5	14	Ring type	20 A (10687494)	<300	MDW-C10-3
		L1, L2 and L3	M3 (slot)	0.51 (4.5)	1.5	14	Ferrule type			
		U, V and W	M3 (slot)	0.51 (4.5)	According to the motor	According to the motor	Ferrule type			
		(Motor PE)	M4 (Philips)	1.8 (15.6)	According to the motor	According to the motor	Ring type			
SCA06D14P0T4	D	(PE)	M4 (Philips)	1.8 (15.6)	2.5	12	Ring type	35 A (10701721)	<340	MDW-C32-3
		L1, L2 and L3	M4 (slot/Philips)	2.35 (20.8)	2.5	12	Ferrule type			
		U, V and W	M4 (slot/Philips)	2.35 (20.8)	According to the motor	According to the motor	Ferrule type			
		(Motor PE)	M4 (Philips)	1.8 (15.6)	According to the motor	According to the motor	Ring type			
SCA06E30P0T4	E	(Mains PE)	M5 (Phillips)	3.5 (31.0)	10	8	Lug type	80 A (10705995)	<2100	MDW-C70-3
		R/L1, S/L2, T/L3,	M5 (Pozidriv)	2.7 (24.0)	10	8	Grommet type			
		U/T1, V/T2, W/T3	M5 (Pozidriv)	2.7 (24.0)	According to the motor	According to the motor	Grommet type			
		(Motor PE)	M5 (Phillips)	3.5 (31.0)	According to the motor	According to the motor	Lug type			

(*) 1Ø: Single-phase supply cable gauge.

(**) Use copper cables only 75 °C (167 °F).

NOTE!
The wire gauges listed in Table 3.1 on page 3-10 are guiding values. Installation conditions and the maximum permitted voltage drop must be considered for the proper wiring sizing.

Input fuses

The fuse to be used in the input must be of the UF type (Ultra-fast) with I^2t equal to or below the indicated in Table 3.1 on page 3-10 (consider the cold current extinction value, not the melting value) for the protection of the input rectifier diodes of the servo drive and of the wiring.

Optionally, time-delay slow blow fuses may be used, dimensioned for 1.2 x rated input current of the servo drive. In this case, the installation is protected against short circuit, except the rectifier bridge diodes in the servo drive input. That may cause major damages to the servo drive in case some internal component part fails.

3.2.3 Power Connections

Figure 3.5 on page 3-11 shows a complete diagram of the SCA06. In the sequence, each step is described individually:

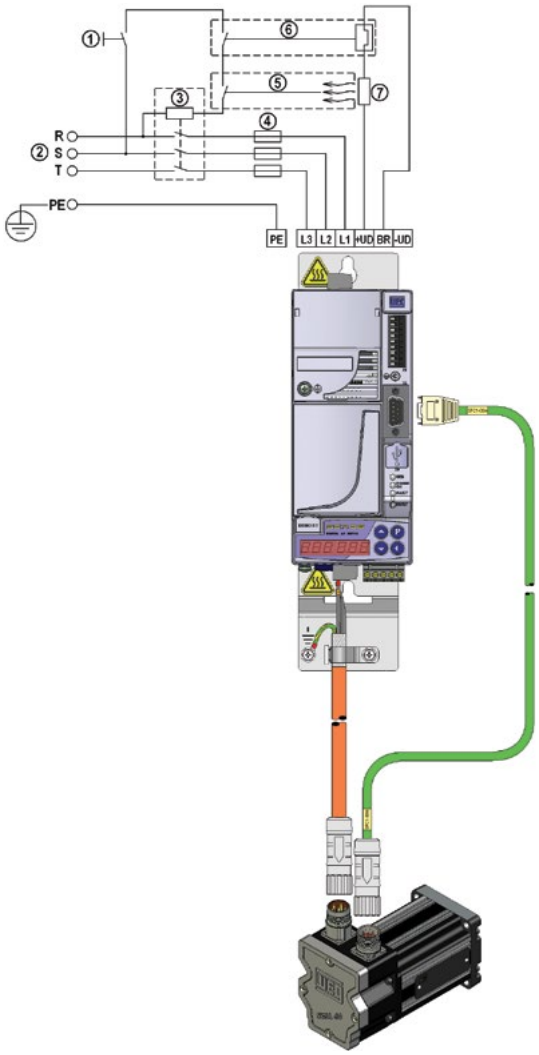
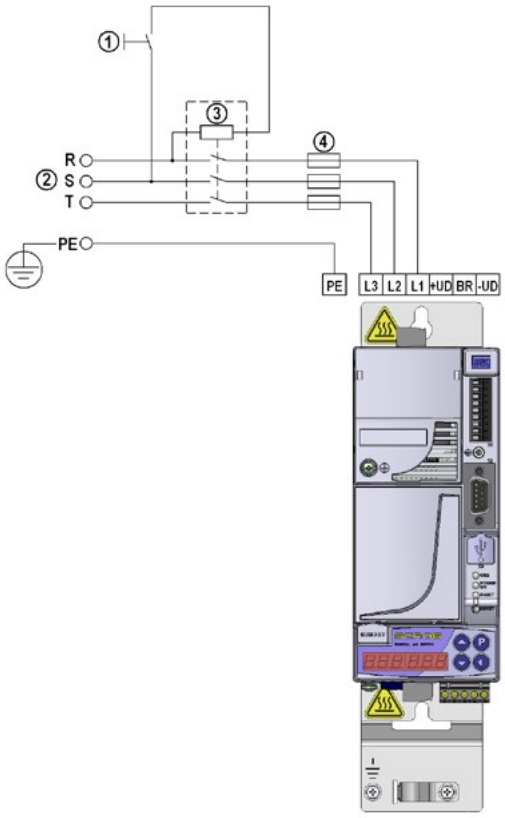


Figure 3.5: *Power and grounding connections*

3.2.3.1 Input Connections

The minimum recommended connection at the servo drive is shown in Figure 3.6 on page 3-12. As an alternative, a circuit breaker can be used in place of the contactor and ON/OFF switch.

The point to connect the PE can be observed in Figure 3.4 on page 3-8.



1 – ON/OFF switch
2 – Power supply
3 – Contactor
4 – Fuses

Figure 3.6: *Input connection*

DANGER!
Provide a disconnect device for the input power supply of the servo drive.
This device shall disconnect the input power supply for the servo drive when needed (for instance, during servicing).

DANGER!
Montez un dispositif de coupure sur l'alimentation du Entraînement d'asservissement.
Ce composant déconnecte l'alimentation du Entraînement d'asservissement si cela est nécessaire (ex. pendant l'entretien et la maintenance).

ATTENTION!
The power supply that feeds the servo drive must have a grounded neutral.

NOTE!
The power supply voltage must be compatible with the servo drive rated voltage.

NOTE!
Power factor correction capacitors are not needed at the input (L1, L2, L3) and must not be installed at the output (U, V, W).

Power supply capacity

The SCA06 is suitable for a circuit capable of delivering not more than 30.000 symmetrical A_{rms} (220 V) or 100.000 symmetrical A_{rms} (380…480 V).

In case the SCA06 is installed in power lines with current capacity greater than the specified values (30.000 A_{rms} and 100.000 A_{rms}), it is necessary to use proper protection circuits, such as fuses or circuit breakers.

3.2.3.2 Rheostatic Braking

3.2.3.2.1 Dimensioning

In Table 3.2 on page 3-13 are the recommended resistor values for each servo drive model, as well as the quantity of resistors that can be connected. Lower resistance values (ohms) must not be used, because they damage the braking. The data refer to the RF200 set offered by WEG.

Table 3.2: *Quantity of braking resistors by servo drive*

Servo drive	Recommended Resistor		Minimum Wiring
	Model	Quantity	mm² (AWG)
SCA06B05P0D2	RF200 (30 Ω, 200 W, 2200 J)	01	1.5 (14)
SCA06C08P0T2	RF200 (30 Ω, 200 W, 2200 J)	02 in parallel (15 Ω)	2.5 (12)
SCA06D16P0T2	RF200 (30 Ω, 200 W, 2200 J)	03 in parallel (10 Ω)	4.0 (10)
SCA06D24P0T2	RF200 (30 Ω, 200 W, 2200 J)	03 in parallel (10 Ω)	4.0 (10)
SCA06C05P3T4	RF200 (30 Ω, 200 W, 2200 J)	02 in series (60 Ω)	2.5 (12)
SCA06D14P0T4	RF200 (30 Ω, 200 W, 2200 J)	01	4.0 (10)
SCA06E30P0T4 (*)	RF200 (30 Ω, 200 W, 2200 J)	02 in parallel(15 Ω)	6.0 (8)

(*) Mechanics E contains plastic parts over the DC-, DC+ and BR terminals. It is necessary to break those parts in order to access the terminals.

The RF200 set is mounted on a metallic bracket ready to be installed on the machine or application. This resistor meets the requirements of most applications. For further details, refer to item 8.3.3 Braking Resistor RF200 on page 8-27.

3.2.3.2.2 Installation of the Braking Resistor

Connect the braking resistor between the power terminals +UD and BR.

Use a twisted cable for the connection. The minimum gauge is informed in Table 3.2 on page 3-13. Separate these cables from the signal and control signal.

If the braking resistor is mounted within the cabinet of the servo drive, consider its energy when dimensioning the ventilation of the cabinet.

DANGER!
The braking transistor and resistor may suffer damages if the resistor is not properly dimensioned, if the parameters are not correctly set and/or if the supply voltage exceeds the maximum permitted value. In order to ensure the protection of the installation in case of a braking circuit failure and prevent the destruction of the resistor or risk of fire, a thermal relay must be included in series with the resistor and/or a thermostat in contact with its housing, connected so as to disconnect the input power supply of the servo drive in case of overheating of the resistor, as shown in Figure 3.7 on page 3-14.

DANGER!
Le transistor et la résistance de freinage peuvent subir des dégâts si la résistance est mal dimensionnée, si les paramètres sont mal réglés et/ousi la tension d'alimentation dépasse la valeur permise maximale. Afin d'assurer la protection de l'installation en cas de défaillance du circuit de freinage et et afin d'éviter la destruction de la résistance ou un risque d'incendie, un relais thermique doit être inclus en série avec la résistance et/ou un thermostat en contact avec son boîtier, connecté de manière à déconnecter l'alimentation électrique d'entrée de la servocommande en cas de surchauffe de la résistance, comme indiqué sur la Figure 3.7 on page 3-14.

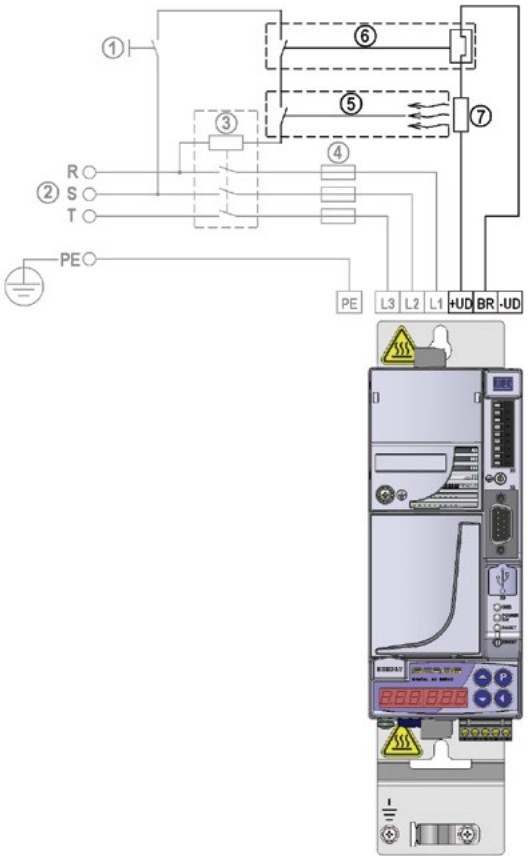


Figure 3.7: *Rheostatic braking connections*

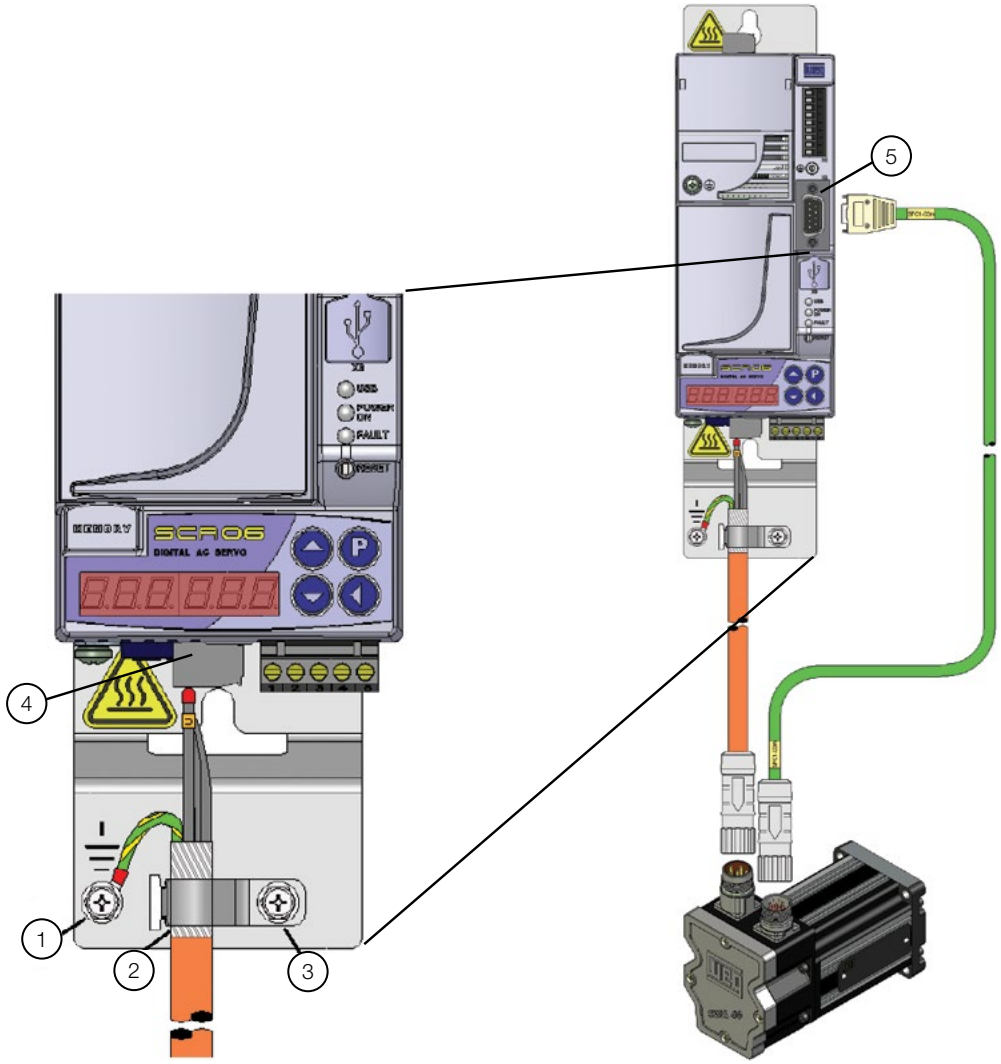
Table 3.3: *Thermal relay setting to protect the braking resistor*

Thermal Relay Setting			
Model	**Thermal Relay WEG**	**Current Setting**	**Actuation Time in Case of Fault**
SCA06B05P0D2	RW 27 - 1D2 - D028 + Fixation plate BF27D	2.5 A	20 s
SCA06C08P0T2			
SCA06C16P0T2	RW 27 - 1D2 - D063 + Fixation plate BF27D	5 A	
SCA06C24P0T2			
SCA06C05P3T4	RW 27 - 1D2 - D028 + Fixation plate BF27D	2.5 A	
SCA06D14P0T4	RW 27 - 1D2 - D063 + Fixation plate BF27D	5 A	
SCA06E30P0T4	RW27 - 1D2 - D063 + Fixation base BF27D	6 A	10 s

NOTE!
In the bimetallic power contacts of the thermal relay circulates direct current during the braking.

3.2.3.2.3 Output Connections

The output connections are done with the power cable and the feedback cable. The grounding of the power cable shield must be done by using a metal clamp in models where it is available, as shown in Figure 3.8 on page 3-15, or directly to the heatsink in models without the clamp. The grounding of the shield is intended to minimize eventual radio-frequency interferences (RFI).



1 – Servomotor grounding (PE).
2 – Cable shield grounding (exposed metallic shield).
3 – Screw to fix the clamp on the cable metallic shield.
4 – Motor connection.
5 – Resolver Feedback connection (X2).

Figure 3.8: *Output connections*

ATTENTION!
The characteristics of the cable used to connect the servo drive to the servomotor, as well as its interconnection and routing, are extremely important to avoid electromagnetic interference in other equipment and not to affect the life cycle of windings and bearings of the servomotors.

ATTENTION!
If a disconnect switch or a contactor is installed at the power supply of the servomotor, never operate it with the servomotor spinning or with voltage at the servo drive output.

Instructions for the servomotor cables:

WEG offers a complete range of cables to interconnect the servo drive and servomotor. The complete list with the characteristics and applications of each model are in item 8.3.2 Cables for Servomotors on page 8-18.

Below are shown the installation details of the servo drive cable.

Installation:

The cables supplied by WEG are designed for a fast, safe and reliable installation. The connection to the servo drive is done by connecting the motor feedback cables U-V-W to the plug-in type connector X8 and the connection of the PE cable to the frame of the servo drive. The cable shield must be connected to the frame by means of the clamp. The details of the power cable installation can be observed in Figure 3.8 on page 3-15.

If the shield connection is not in accordance with the directions of this manual or is not done, that may cause electromagnetic interference (RFI).

3.2.3.3 Considerations on Grounding

DANGER!
Do not share the grounding wiring with other equipment that operate with high currents (e.g. high power motors, soldering machines, etc.). When installing several servo drive, follow the procedures presented in Figure 3.9 on page 3-17 for the grounding connection.

DANGER!
Ne pas partager le câblage de mise à la terre avec d'autres équipements opérant avec des intensités élevées (par ex: moteurs haute puissance, postes de soudure, etc.). Lors de l'installation de plusieurs Entraînement d'asservissement, appliquer les procédures présentées dans l'illustration Figure 3.9 on page 3-17 pour la connexion de mise à la terre.

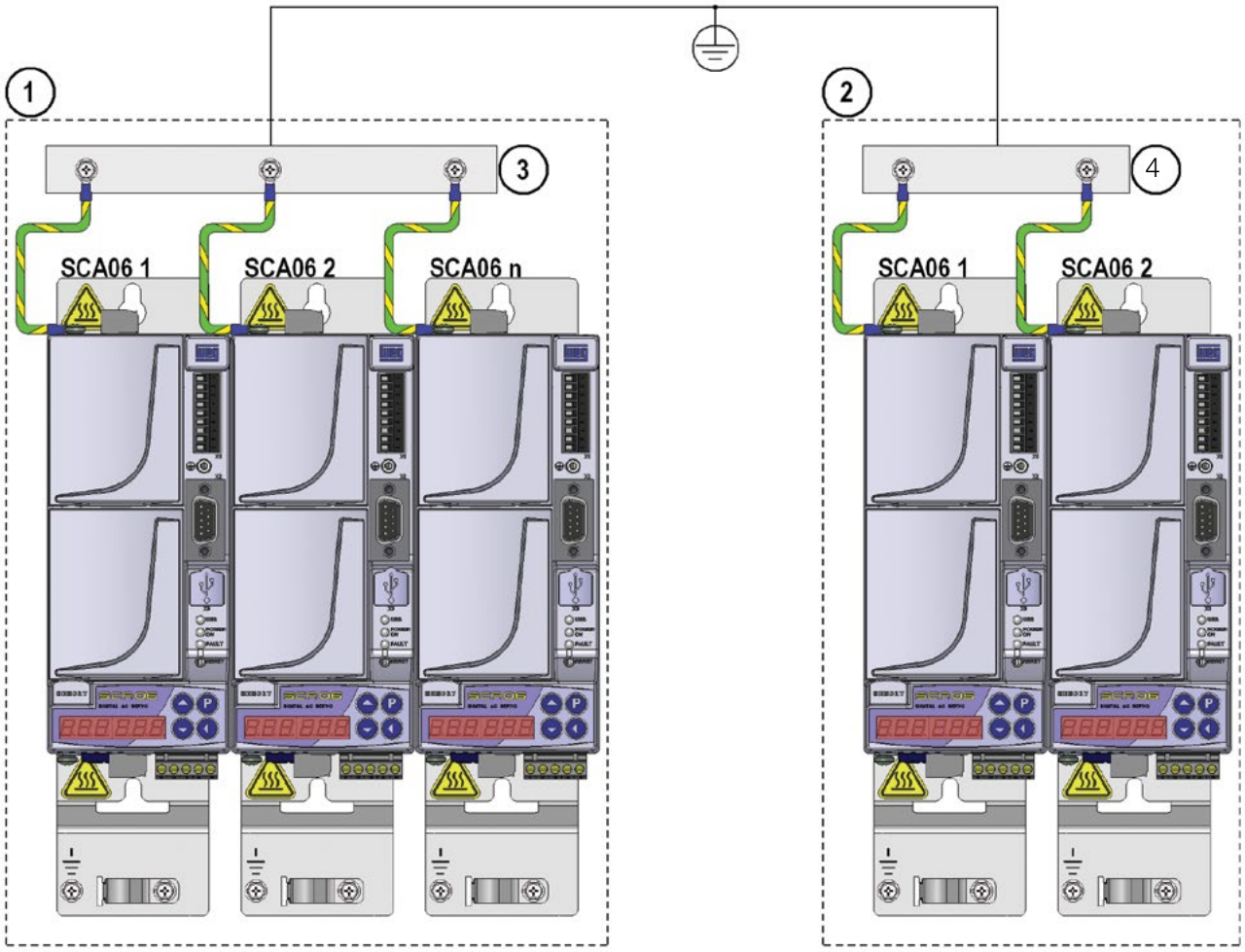
ATTENTION!
The neutral conductor of the supply that powers up the servo drive must be solidly grounded; however, this conductor must not be used to ground the servo drive.

DANGER!
The servo drive must be connected to a protective earth (PE). The location of the grounding point of the SCA06 is shown in Figure 3.4 on page 3-8.
Observe the following:

- Use grounding wire of a gauge at least equal to the indicated in Table 3.1 on page 3-10. In case there are local standards that require different gauges, they must be observed.
- Connect the grounding points of the servo drive to a specific grounding rod, or specific grounding point or to the general grounding point (resistance ≤ 10 Ω).
- For compatibility with standard IEC 61800-5-1, use at least a copper cable of 10 mm² or two cables with the same gauge as the grounding cable specified in Table 3.1 on page 3-10 to connect the servo drive to the protective earth, since the leakage current is greater than 3.5 mAac.

DANGER!
La servocommande doit être connectée sur un conducteur de terre de protection (PE). L'emplacement du point de mise à la terre du SCA06 est indiqué sur la Figure 3.4 on page 3-8.
Observer ce qui suit :

- Utiliser un fil de mise à la terre d'une épaisseur égale ou supérieure à ce qui est indiqué dans le Table 3.1 on page 3-10. Si des normes locales exigent différentes épaisseurs, il faut les respecter.
- Connecter les points de mise à la terre de l'entraînement sur une tige de mise à la terre spécifique, soit sur le point de mise à la terre spécifique soit sur le point de mise à la terre général (résistance ≤ 10 Ω).
- Pour la compatibilité avec la norme CEI IEC 61800-5-1, utiliser un câble en cuire d'au moins 10 mm² ou deux câbles ayant la même épaisseur que le câble de mise à la terre spécifié dans le Table 3.1 on page 3-10 pour connecter la servocommande sur le conducteur de terre de protection, étant donné que le courant de fuite est supérieur à 3,5 mA C.A.



1 – Machine 1.
2 – Machine 2.
3 – Machine grounding rod 1.
4 – Machine grounding rod 2.

Figure 3.9: *Grounding connections for more than one servo drive*

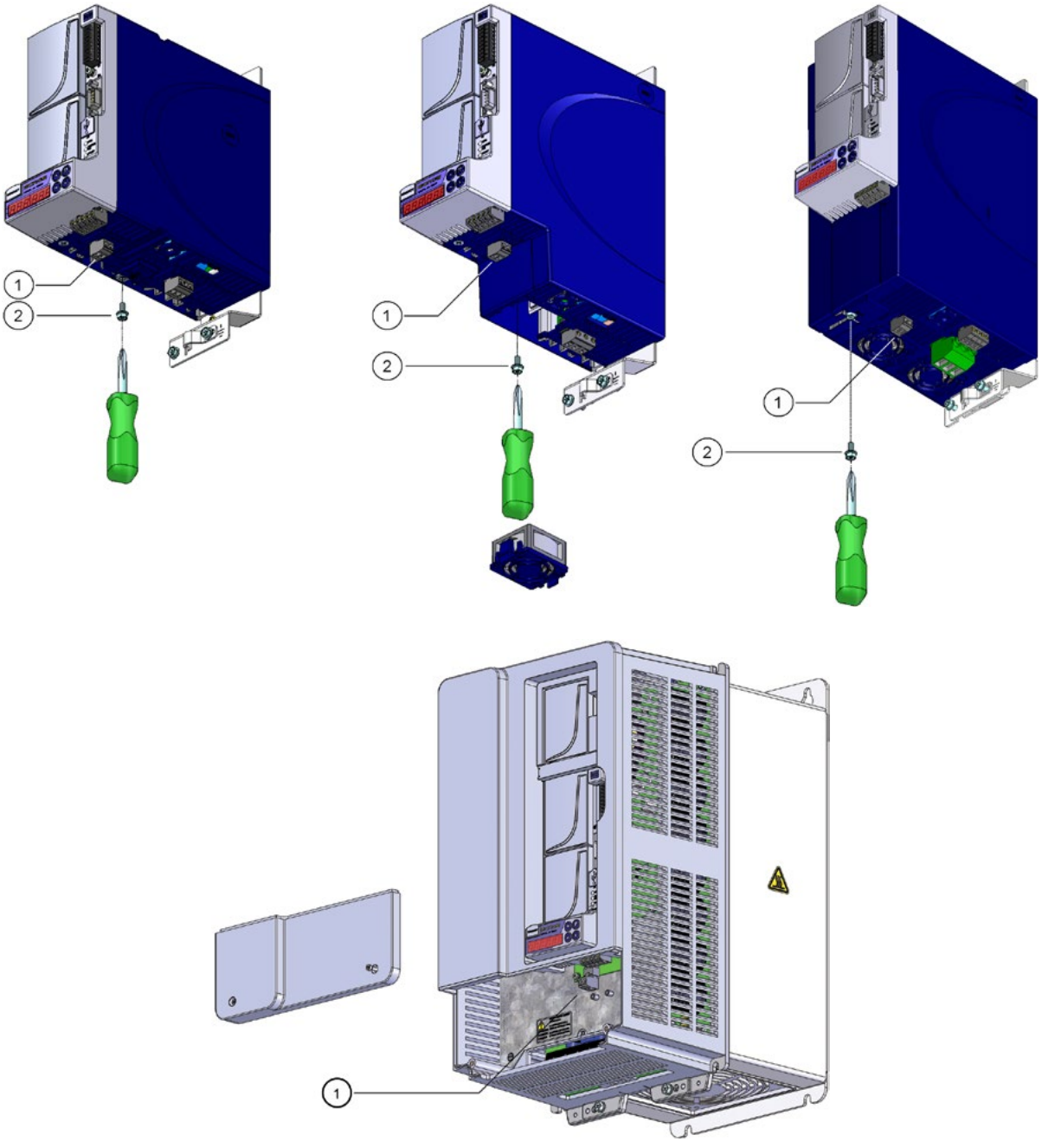
3.2.4 Control Connections

3.2.4.1 Control Supply

In the standard product, the control must be powered separately by means of a 24 Vdc external power supply connected to connector X5. Doing so, all the power stage of the servo drive can be turned off without losing its communication with other devices connected in network, for instance.

Specifications of the external supply of 24 Vdc, -15 %, +20 %, current:
1 A (models SCA06B05P0D2 and SCA06C08P0T2)
2.5 A (other models).

Note: The supply reference (-) is interconnected to the protective earth (PE) by means of a grounding screw.
If not desired or if problems of circulating currents occur because the 24 Vdc external supply is also grounded, the connection to the PE can be opened by simply removing the grounding screw.
The location of the screw is shown below; in the SCA06C08P0T2, it is necessary to remove the fan to access the screw.



1 – Control supply
2 – Power supply grounding screw

Figure 3.10: *Control supply connection*

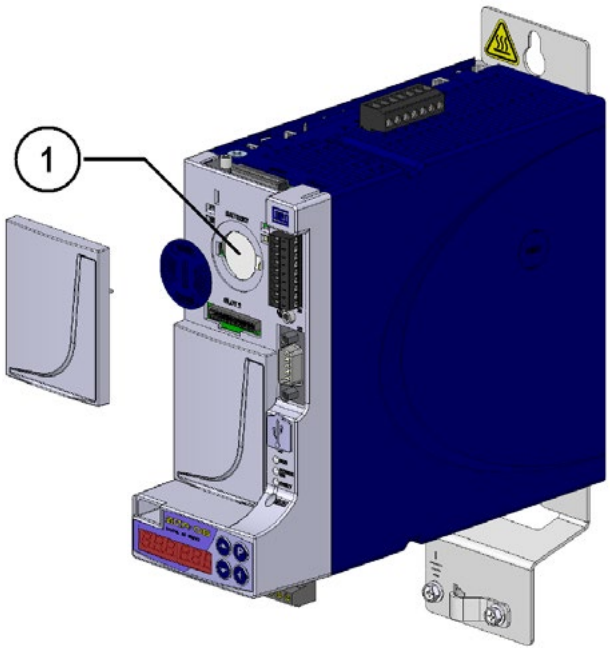
Models SCA06_____**W2** feature the supply imbedded in the product and do not need external +24 Vdc supply. More details about the use of this supply can be found item 8.1.2 Internal Control Supply on page 8-2.

3.2.4.2 Installation of the Battery

The battery is used to keep the operation of the clock and retentive memory of the user when the servo drive is powered down. The battery of the SCA06 is supplied separately. In order to install it, remove the cover of slot 2 (or an accessory, according to section 8.2 ACCESSORIES on page 8-2) located in the front part of the servo drive and then turn the battery cover and remove it. The control of the SCA06 must be energized at the moment of installing the battery in the control card.

- Battery consumption with the servo drive energized: 1.5 µA.
- Battery consumption with the servo drive de-energized: 22 µA.
- Battery approximate duration with the servo drive de-energized: 01 year*.

* Consumption just for reference. For a precise estimate, contact the battery manufacturer.



1 – CR2032-type battery

Figure 3.11: *Battery location*

Installation procedure:

1. Turn off the control and the power of the servo drive.
2. Remove the accessory or cover of Slot 2 as shown in Figure 3.11 on page 3-19.
3. Turn on the control of the SCA06 (power up the 24 V supply).
4. Install the battery.
5. Turn off the control.
6. Put the accessory or cover back on Slot 2.

ATTENTION!
The battery must be installed with the control circuit powered up.

ATTENTION!
When using resources that use the battery (real time clock and retentive memory) it is advisable to activate the low battery alarm (refer to the programming manual).

NOTE
At the end of the useful life, do not dispose of the battery in common garbage, but in a proper place for batteries.

3.2.4.3 Control Inputs and Outputs (X1)

The control connections (analog inputs/outputs, digital inputs/outputs) must be done to connector X1 of the SCA06.

The typical connection functions are shown in Figure 3.12 on page 3-20.

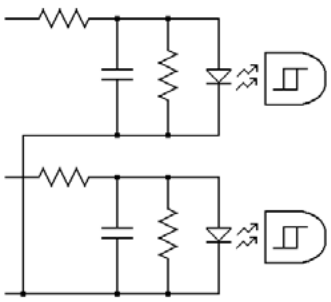
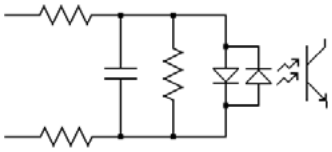
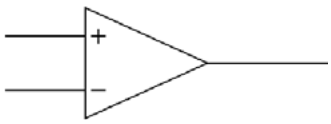
X1	Description		Function	Specification
1	C		Digital output 1 relay	Vmax: 240 Vac 200 Vdc Imax.: 0.25 A @ 240 Vac 0.50 A @ 125 Vac 2.00 A @ 30 Vdc Typical ton/off : 3 ms Average useful life: 100,000 operations.
2	NA			
3	DI1		Digital input 1 opto-coupled	High level: ≥ 18 V Low level: ≤ 3 V Max voltage: 30 V Input current: 3.7 mA@24 Vdc Maximum frequency: 500 kHz Maximum delay time: 0.5 us
4	DI2			
5	COM 1,2		Digital input 2 opto-coupled	
6	DI3		Digital input 3 opto-coupled	High level: ≥ 18 V Low level: ≤ 3 V Max voltage: 30 V Input current: 11 mA @ 24 Vdc Maximum delay time: 100 us
7	COM 3			
8	AI1 +		Analog input 1 differential	Signal: -10 a +10 V Resolution: 12 bits Vmax: ±14 V Impedance: 400 kΩ
9	AI1 -			

Figure 3.12: *Connector X1*

For the correct installation of the control wiring, use:

1. Gauge of the cables: 0.5 mm² (20 AWG) to 1.5 mm² (14 AWG).
2. Maximum torque: 0.5 N.m (4.50 lbf.in).
3. Wiring in X1 with shielded cable and separated from the other wiring (power, control in 110 / 220 Vac, etc.), according to Table 3.4 on page 3-21. In case the crossing of those cables is unavoidable, it must be done in a perpendicular way, keeping the minimum distance of 5 cm (1.96 in) in this point.
4. Relays, contactors, solenoids or coils of electromechanical brakes installed close to servo drives may occasionally generate interference in the control circuitry. In order to eliminate this effect, RC suppressors (with AC power supply) or freewheel diodes (with DC power supply) must be connected in parallel to the coils of these devices.

Table 3.4: Cable separation distance

Wiring Length	Minimum Separation Distance
≤100 m (330 ft)	≥ 10 cm (3.94 in)
> 100 m (330 ft)	≥ 25 cm (9.84 in)

The correct connection of the cable shield is shown is Figure 3.12 on page 3-20.

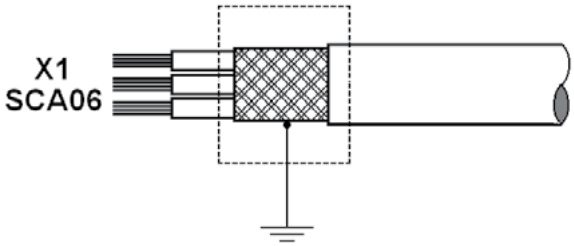


Figure 3.13: Shield connection

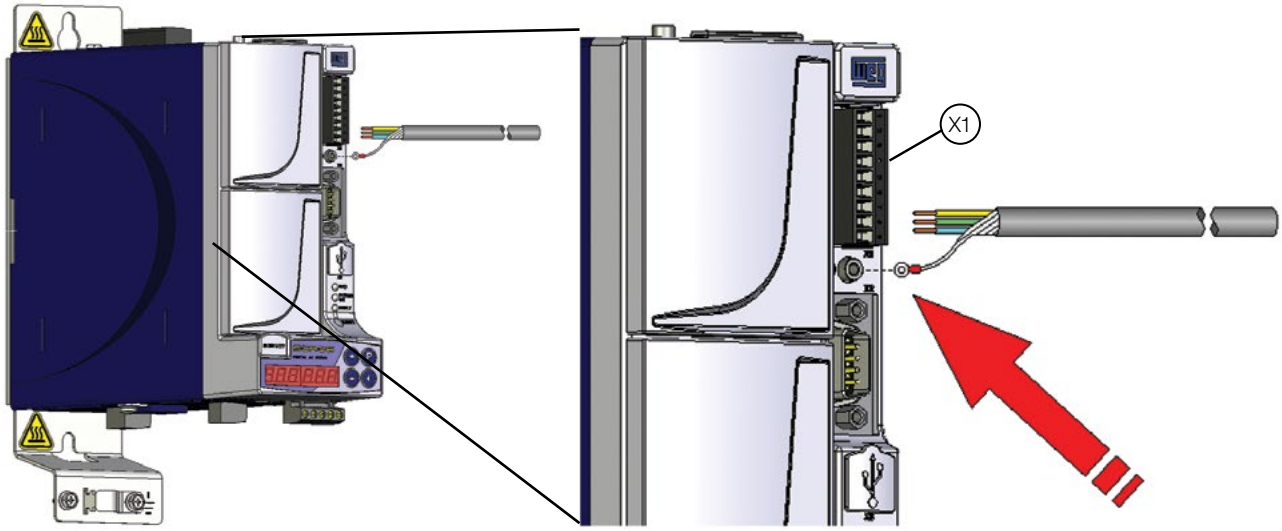
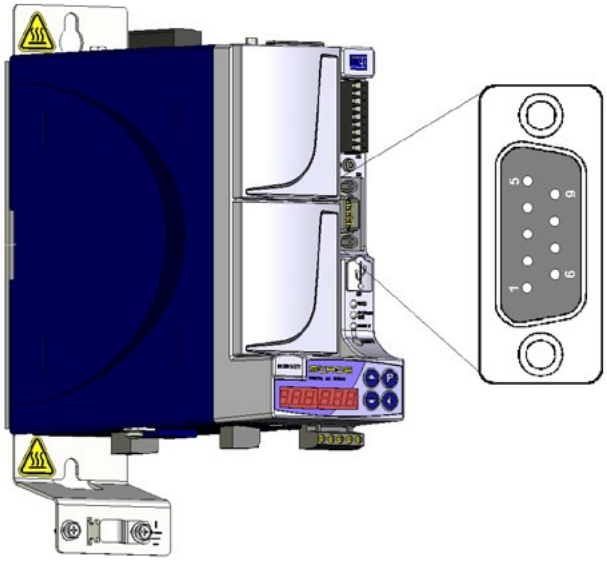


Figure 3.14: Example of control cable shield connection

3.2.4.4 Position Feedback Connection (X2)

This connector receives the feedback signals from the Resolver of the servomotor. The Resolver function is to inform the servo drive the exact position of the servomotor shaft. This connection must always be done, otherwise the SCA06 will indicate Fault F00032.



Connector X2	
Pin	**Function**
1	- COS
2	+ 5 V
3	-SEN
4	GROUND
5	+OSC
6	PTC
7	+COS
8	+SEN
9	GND

Figure 3.15: Position feedback connector X2 and respective pinout

NOTE!
The positioning precision is limited by the Resolver (position feedback device) and is of ± 10 minutes of arc (1° = 60 minutes of arc).

3.2.4.5 USB Port (X3)

The SCA06 features a USB port (connector X3) which enables the servo drive to operate as a device (slave) in a USB communication. This port is available for communication of the servo drive with a personal computer and allows the reading/writing of parameters and download/monitoring of the user's program. In order to do so, WEG provides a software (in a CD that comes with the manual kit or via download in the company's website) suitable to be used in the personal computer.

- As it is in a non-isolated interface, it must not be used to operate the servo drive; it must only be used for configuration at its start-up.
- The cable used for USB communication must be standard host / device shielded USB cable.
- Cables without shield may cause communication errors.

Example of cables:
USBC-AM-MB-B-B-S-1, manufacturer Samtec, 1 meter (3.2 ft).
USBC-AM-MB-B-B-S-2, manufacturer Samtec, 2 meters (6.5 ft).
USBC-AM-MB-B-B-S-3, manufacturer Samtec, 3 meters (9.8 ft).

The models SCA06 _ _ _ _ _ _ _**P6** come from the factory with the manual set of the product and also the 2 meter (6.5 ft) USB cable.

ATTENTION!
The servo drive and the computer must be in the same earth potential. It is recommended the use of laptop computers instead of desktops.

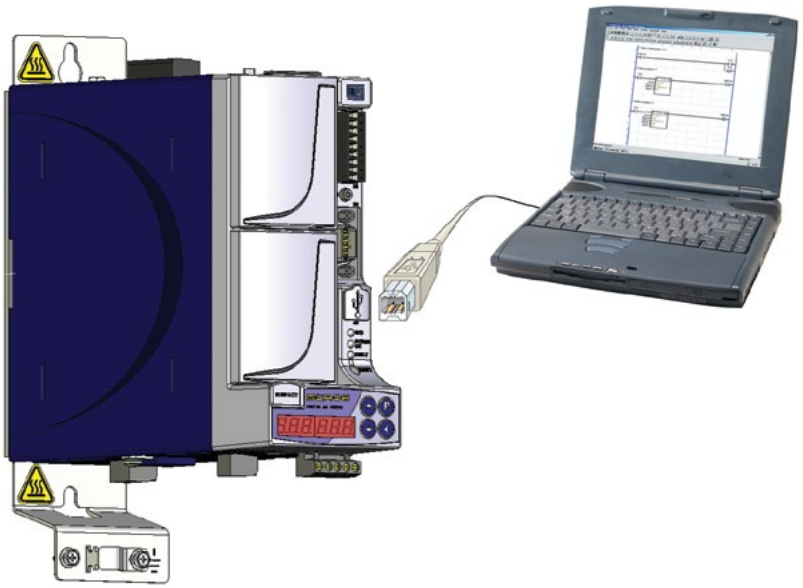
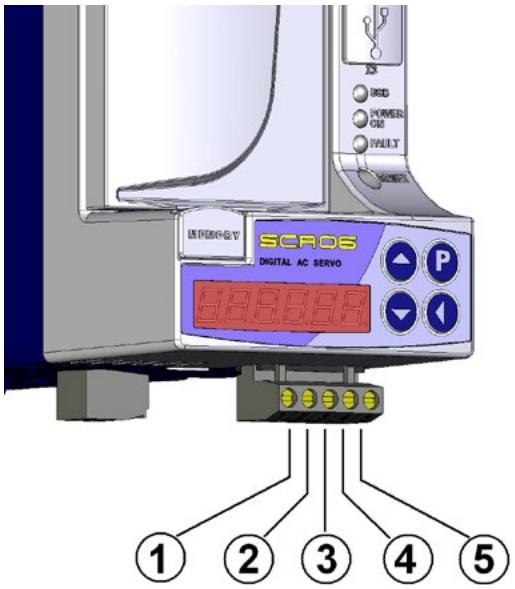


Figure 3.16: *Connection to the computer via USB (X3)*

3.2.4.6 CAN Network (X4)

The CAN interface (Controller Area Network) is an isolated communication network with speed of up to 1 Mbaud, seeing that the CANopen protocol is implemented in the SCA06 (see details in the CANopen manual). It is supplied as standard from the factory with all the SCA06 devices. Its connection is done in connector X4, according to the pinout presented in Figure 3.17 on page 3-23. It is recommended the use of a shielded cable with two pairs of twisted wires. It is also necessary to provide a power supply of 24 Vdc (-15 %, +20 %) to the network connector. A terminal resistor (120 Ω) must also be used in the extreme devices connected to the CAN network. This resistor must be connected between pins 2 and 4 of the connector.

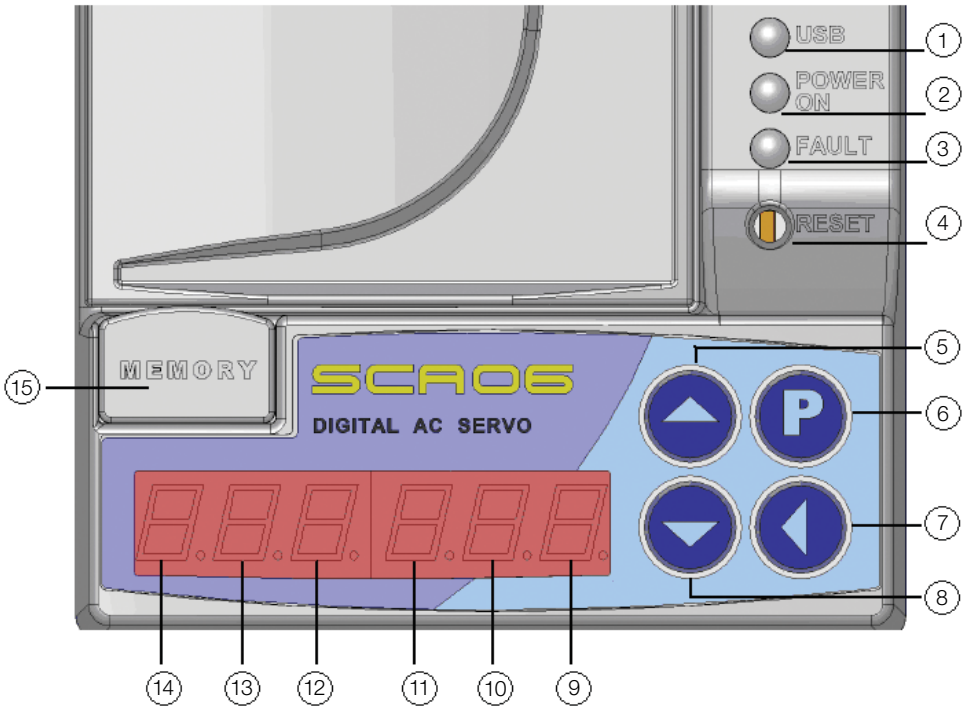


Connector X4
1 – V-
2 – CAN L
3 – Shield
4 – CAN H
5 – V+

Figure 3.17: *Pins of the CAN network connector (X4)*

4 HMI

Through the HMI it is possible to control the servo drive, view and set all of the parameters. It features a LED display with six digits of seven segments and four keys with the increase, decrease, PROG and SHIFT functions.



1 – USB communication indicating LED
2 – Power ON indicating LED
3 – Fault indicating LED
4 – Reset key
5 – Increase key
6 – PROG key
7 – SHIFT key
8 – Decrease key
9 – Digit 1
10 – Digit 2
11 – Digit 3
12 – Digit 4
13 – Digit 5
14 – Digit 6
15 – Flash memory card

Figure 4.1: *Illustration of the HMI*

4.1 KEYS

The servo drive HMI is not detachable and features four keys whose functions are described below:

PROG: Key used to change the mode of the parameters and/or validate the modified values. When the parameters are in the search mode, pressing the P key will change them to the view or modification mode, depending on the selected parameter. Some parameters, whose property is PP (Press P), have their value modified only after pressing the P key.

For parameters that may be modified online, the servo drive starts using the new adjusted value immediately and those parameters have only two modes: the search mode (which presents the letter P and then the parameter number) and the modification mode (which presents the content of the selected parameter, allowing the modification).

The parameters that must not be modified online can have three modes: the two mentioned above and an intermediate one: the view mode which only displays the content of the parameter without allowing any modification. In this case, the modified value (already in the modification mode) is only used by the servo drive after the P key is pressed, returning to the search mode.

When the P key is pressed in the parameters that are not "Only reading", the value contained in the parameter is automatically recorded in the non-volatile memory of the servo drive and remains recorded until new change, except when the parameter P00664 = 0.

DECREASE: Key used to navigate in a decreasing way through the parameters, or, when in the modification mode, decrease the content of the respective parameter.

INCREASE: Key used to navigate in an increasing way through the parameters, or when in the modification mode, increase the content of the respective parameter.

SHIFT: When the key is pressed in the View mode the parameter returns to the Search mode, displaying the parameter number. When pressed in the View mode, it allows the user to move the digit he wishes to change and the digit will show flashing in the HMI, indicating that it is the selected. For example: P00105 in the Modification mode: HMI displays the value 00200 with the digit 1 (value 0) flashing. The user wishes to modify the 5th digit. In order to do so, the user must press the SHIFT key four times; then the digit 5 (value 0) will start flashing indicating that, when pressing the increase or decrease key, its value will be modified.

Reset Located above the HMI keys, this key is accessed with a small screwdriver or similar tool. Its effect is the same as turning off and back on the control, that is, whenever it is pressed, the software of the servo drive will reinitialize.

General Notes:

- To modify the value of a parameter, it is necessary first to adjust P00000 = Password Value, except when the option “Disable Password” is activated (P00200 = 0). The default password value is P00000 = 00005. Otherwise, it will only be possible to view the parameters, but not to modify them.

4.2 LEDs

USB LED

It indicates there is communication between the servo drive and some other device connected to the USB network.

Power on LED

It indicates that the power circuits are connected or with residual energy in case the servo drive is OFF.

DANGER!
Never touch the terminals and/or components of the servo drive while the power on LED is ON.

DANGER!
Ne jamais toucher les bornes et/ou les composants de la servocommande lorsque la LED d'état est allumée.

Fault LED

It indicates that there was a fault in the servo drive. The fault code can be seen in the HMI of the servo drive and solved by referring to chapter 7 TROUBLESHOOTING AND MAINTENANCE on page 7-1.

5 FLASH MEMORY CARD

Functions:

- It stores the image of the parameters and/or user's program of the servo drive.
- It allows to transfer parameters and/or the user's program stored in the FLASH memory card to the servo drive.

For further details refer to the programming manual of the SCA06.

ATTENTION!
Before connecting or disconnecting the FLASH memory card, de-energize the control circuit of the servo drive.

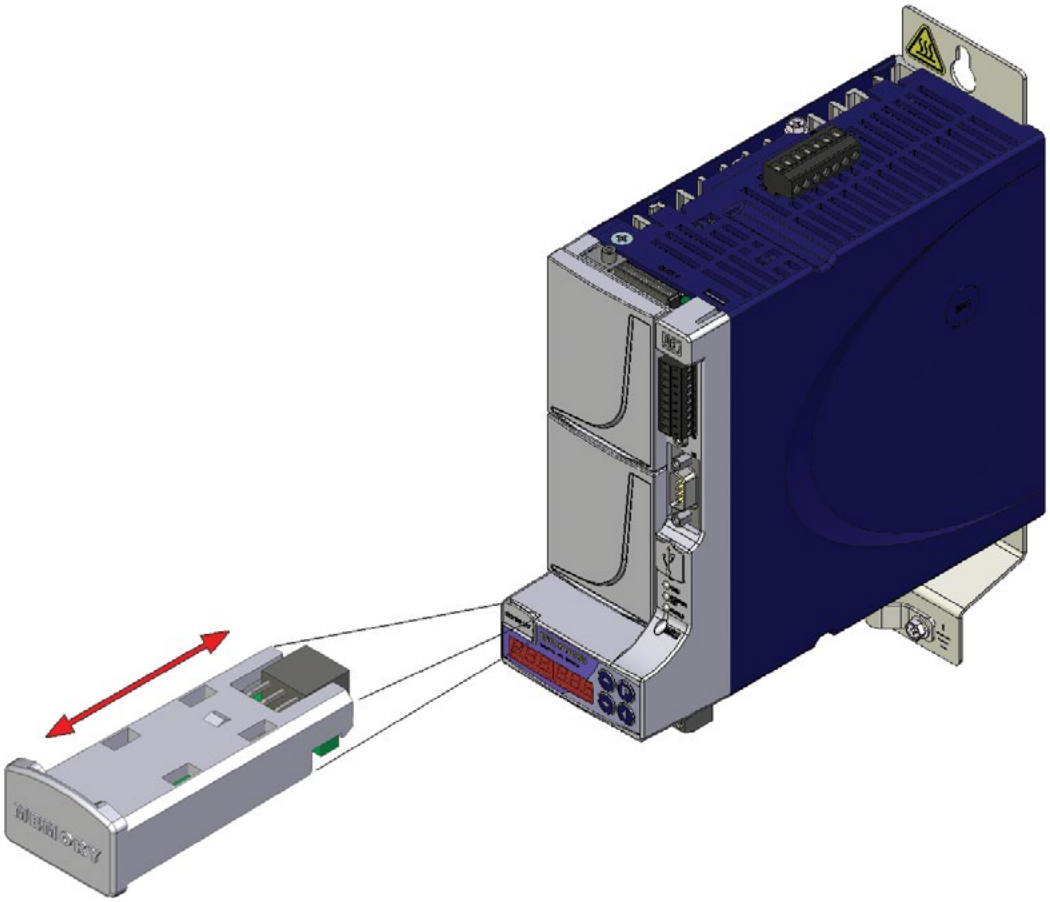


Figure 5.1: *Flash Memory*

6 ENERGIZING AND START OF OPERATION

This chapter explains:

- How to check and prepare the servo drive before energizing it.
- How to energize and check the success of the energizing.
- How to program the servo drive according to the servomotor used in the application by using the guided Start-Up routine.

6.1 PREPARATION AND ENERGIZING

The servo drive must be already installed according to chapter 3 INSTALLATION AND CONNECTION on page 3-1. If the drive project is different from the typical suggested drives, the following steps may also be followed.

DANGER!
Always disconnect the main power supply before performing any servo drive connection.

DANGER!
Débranchez toujours l'alimentation principale avant d'effectuer une connexion sur le Entraînement d'asservissement.

1. Check if the power, grounding and control connections are correct and tight.
2. Measure the network voltage and check if it is within the permitted range, as described in section 9.1 POWER DATA on page 9-1.
3. Measure the 24 Vdc supply voltage which supplies the control and check if it is within the permitted range, as described in section 9.2 ELECTRONICS/GENERAL DATA on page 9-2.
4. Mechanically uncouple the servomotor from the load:
   If the servomotor cannot be uncoupled, it must be ensured the spinning in any direction (clockwise or counter clockwise) will not cause damages to the machine or risk of accident.
5. Energize the control:
   The HMI must display P00000.
6. Energize the power:
   Close the input disconnecting switch.
   The red LED “Power on” must turn on.

6.2 PROGRAMMING AND OPERATION

The SCA06, besides its basic function of servo drive, features two additional functions: PLC and Motion Controller, which are accessible via programming in ladder language in a personal computer using the appropriate WEG programming software(1).

The servo drive can be controlled by an external device (such as a CNC, for instance) via analog/digital inputs/outputs or via communication networks (CANopen network, for instance). It may also be operated independently by using its PLC/Motion Controller functions via ladder programming.

The way of operation of the servo drive is defined primarily by the parameter P00202:

(1) Available via download from WEG website or in the CD that comes with the manual set.

1. Control via external device using analog/digital I/Os: program P00202 in 1 or 2 according to application (torque or speed control).

2. Control via external device using CANopen network: program P00202 in 5 (torque, speed or position control).

3. Control via ladder programming of the SCA06: program P00202 in 4 (torque, speed or position control).

In the first case, it is also necessary to program the parameters referring to the Analog/Digital I/Os according to the application. In the second case, it is necessary to program the parameters of the CANopen network and, in the third case, a ladder program made in the personal computer (using the proper WEG software) must be loaded to the servo drive which will execute the necessary functions for the application.

Even if parameter P00202 is not programmed in option 4, it is possible to execute a ladder program in the SCA06; however, in this case, the ladder will not control the shaft, but execute other auxiliary functions, such as logic, etc. By the same token, if the parameter P00202 is not programmed in option 5, the CANopen network can still be used; it just cannot control the shaft.

The SCA06 has control nets of current (torque and flow), speed and position. The current control net is always used and its parameterization is necessary to program the model of WEG servomotor in parameter P00385. Then all the parameters of this net are programmed according to the selected servomotor model. The speed and position nets may be used or not. If used, it is necessary to program their parameters.

6.2.1 Example 1: Operation in Speed Mode with Reference via Parameter

1. Adjustment of the password to modify parameters (P00000).

2. Programming of the motor to be used.

3. Enabling and speed control via parameter.

6.2.1.1 Adjustment of the Password in P00000

Sequence	Action / Result	Indication on the Display
1	SCA06 energized, no faults. (search mode)	
2	Press key P. Then you enter the content of parameter P00000. The selected digit flashes. (modification mode)	
3	Adjust the password by pressing ▲ until number 5 shows on the display.	
4	Press key P. The value is saved.	

Figure 6.1: *Sequence to release the modification of parameters by P00000*

6.2.1.2 Programming of the Motor to Be Used

Motor to be used in the example: SWA-56-2.5-20.

Sequence	Action / Result	Indication on the Display
1	SCA06 energized. (search mode)	
2	Press the key ▲ until reaching parameter P00385.	
3	Press the key P. Then you enter the content of parameter P00385. (view mode)	
4	Press the key P again. Then you enter the edition mode of the parameter and the least relevant digit flashes. (modification mode)	
5	Press the key ▼ until you reach the value corresponding to the motor SWA 56-2,5-20, in this case, 22.	
6	Press the key P. The value is saved.	

Figure 6.2: *Sequence to program the servomotor to be used*

6.2.1.3 Speed Control and Enabling via Parameter

Sequence	Action / Result	Indication on the Display
1	SCA06 energized, no faults.	
2	Press the key ▲ until you reach parameter P00099. This parameter will cause PWM pulses in the motor, that is, it may spin, depending only on the speed reference in P00121.	
3	Press the key P. Then you enter the content of parameter P00099.	
4	Press the key ▲ once to modify the value of the content from 0 to 1.	
5	Press the key P. The value is saved.	
6	Press the key ▲ until you reach parameter P00121.	
7	Press the key P. That will show the content of parameter P00121.	

Sequence	Action / Result	Indication on the Display
8	Press the key to increase the speed. The servomotor must be spinning according to the programmed speed.	
9	Program the desired speed and press the key to save the content.	
10	Press the key until you reach parameter P00099.	
11	Press the key to enter the content of parameter P00099.	
12	Press the key . Then the motor will stop, that is, it will be disabled. Whenever P00099 is enabled, the motor will spin at the speed programmed in P00121.	

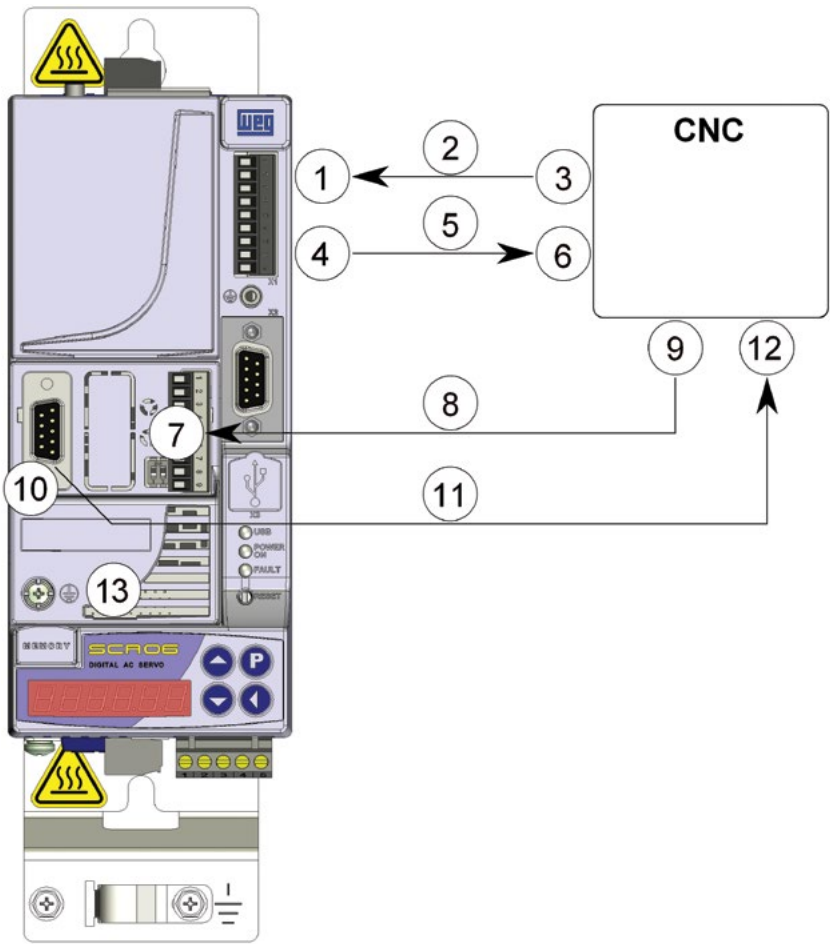
Figure 6.3: *Sequence to enable the servomotor*

6.2.2 Example 2: Operation in Speed Mode - Using Accessory EAN 1 - With Position Control Done by External Device (CNC, for example)

Parameters to be set:
Set password
P00000 = 5
Program motor
P00385 = according to available model
Program operating mode
P00202 = 2
Program DI1 for enabling
P00300 = 1
Program Error via DO1
P00280 = 6
Program speed reference via AI2

P00238 = 2
Program number of pulses of the encoder simulator
P00340 = number of desired pulses (0 to 4096 pulses for speeds up to 3000 rpm and 0 to 1024 pulses for speeds above 3000 rpm.

Connections:
Position feedback to CNC via Encoder Simulator and input and output connections, as follows:



1 – Digital Input
2 – Enabling Control
3 – Digital Output
4 – Relay Digital Output
5 – Error Control
6 – Digital Input
7 – Analog Input
8 – Speed Reference Signal
9 – Analog Output
10 – Encoder Simulator Output
11 – Position Feedback Signal
12 – Encoder Input
13 – EAN 1 Accessory

Figure 6.4: *Example of application number 2*

6.2.3 Example 3: Operation Using Ladder Programming

Parameters to be set:
Set password
P00000 = 5
Program motor
P00385 = according to available model
Program operating mode
P00202 = 4

Connections:
Connect the computer to the SCA06 via USB. On the computer, write and compile the Ladder program using the suitable WEG software. The program must be sent via USB interface to the SCA06 so it can be executed.

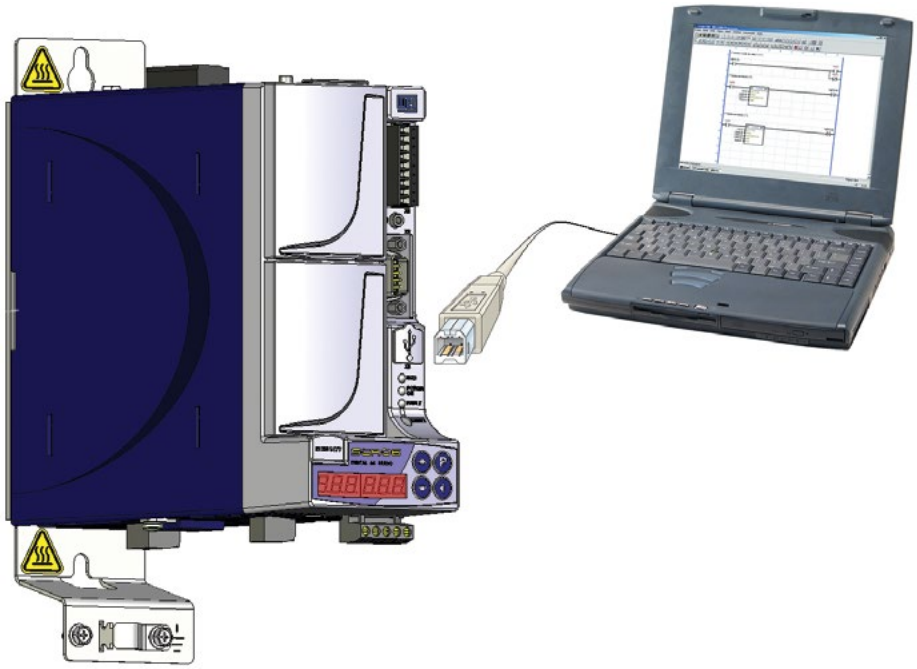


Figure 6.5: *Example of application number 3*

For further details on programming, refer to the programming manual of the SCA06.

7 TROUBLESHOOTING AND MAINTENANCE

This chapter presents:

- List of all possible faults and alarms.
- Most probable causes of each fault and alarm.
- List of most frequent problems and corrective actions.
- Instructions for periodical inspections on the product and preventive maintenance.

7.1 OPERATION OF FAULTS AND ALARMS

When “ALARM” (AXXXXX) is identified:

- The HMI indicates the numeric code of the alarm.
- The servo drive remains in operation, without blocking the PWM pulses.
- The code of the “ALARM” occurred is saved, as well as related information (date, time, etc.).

When “FAULT” (FXXXXX) is identified:

- The PWM pulses are blocked.
- The HMI indicates the numeric code of the fault.
- Red LED “FAULT” turns on.
- The relay that is programmed for “NO FAULTS” is turned off.
- The code of the “FAULT” occurred is saved, as well as related information (date, time, etc.).

For the servo drive to go back to normal operation right after the occurrence of a "FAULT", it is necessary to reset it. Below are some options of reset:

- Turn off the power supply of the control and turn it on again (power-on reset).
- Press the RESET key.
- Modify the value of parameter P00219 from 0 to 1 (leading edge).
- Via digital input: DIx = 6.

7.2 ALARMS, FAULTS AND POSSIBLE CAUSES

For more information about Alarms, Failures and Possible Causes, please refer to the quick reference parameters and programming manual.

7.3 TROUBLESHOOTING MOST COMMON PROBLEMS

Table 7.1: *Troubleshooting most common problems*

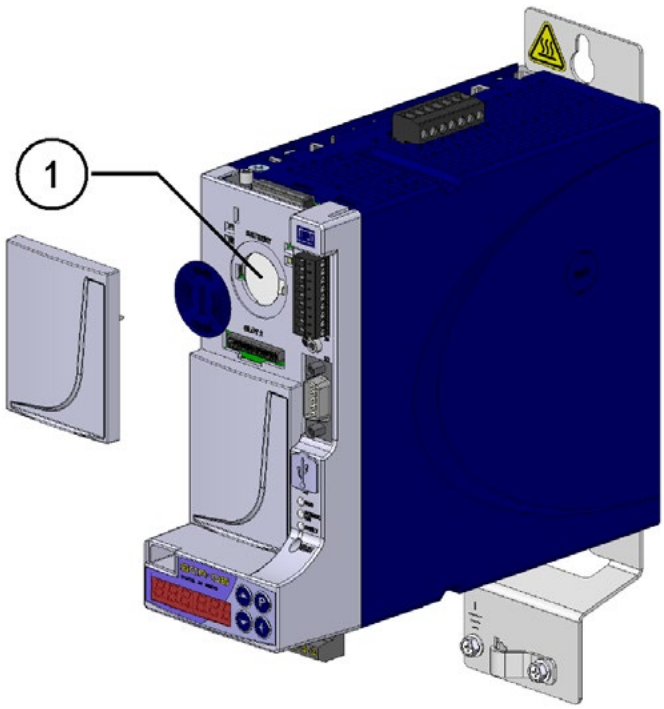
Problem	Item to be Checked	Corrective Action
Display will not turn on	Control supply voltage (X5)	1. Check if the value is between 20 and 30 Vdc 2. Check if the polarity is correct
Differential circuit breaker trips	Differential circuit breaker	1. Check if the circuit breaker tripping current is too low
	RFI filter	1. Disconnect the RFI filter inside the servo drive by removing the screw on the side of the SCA06.
Servomotor will not spin	Wrong wiring	1. Check all the power and control connections. For example, the DIx digital inputs programmed as enabling or external error must be connected to +24 V.
	Analog reference (if used)	1. Check if the external signal is properly connected 2. Check the state of the control potentiometer (if used)
	Wrong programming	1. Check if the parameters have the right values for the application
	Error	1. Check if the servo drive is not blocked due to a detected error condition (see previous line). 2. Check if there is no short circuit between terminals X1:10 and 12 (short circuit on the 24 Vdc supply).
	Motor blocked	1. In the servomotors with brake option, check its supply 2. Check if the machine does not have mechanical problems
Motor speed varies (oscillates)	Loose connection	1. Block servo drive, shut down supply and tighten all the connections
	Defective reference potentiometer	1. Replace potentiometer
	External analog reference variation	1. Identify cause of variation
	Speed regulator gains too low	1. Review the setting of the speed regulator gains in real load condition
Motor speed too high or too low	Wrong programming (servomotor model and reference limits)	1. Check if the contents of P385 (servomotor model), P00121 (speed limit) comply with the motor and application.
	Reference control signal (if used)	1. Check the level of the reference control signal 2. Check programming (gains and offset) of analog inputs
	Motor nameplate data	1. Check if the motor used is suitable for the application
Servomotor with excessive vibration	Wrong programming (servomotor model)	1. Check programming of P385
	Speed regulator gains too high	1. Review the setting of the speed regulator gains in real load condition
Encoder simulation output informing pulses even with the servomotor stopped	Wrong programming (servo drive model)	1. Check the content of P385
	Speed regulator gains too high	1. Decrease a little the speed regulator gains (review speed regulator setting).
Real clock time unadjusted	Battery	1. See section 7.4 BATTERY REPLACEMENT on page 7-2

7.4 BATTERY REPLACEMENT

In order to replace the battery, remove the slot protecting cover 2 (or an accessory, according to section 8.2 ACCESSORIES on page 8-2) located in front of the servo drive and then turn and remove the battery cover. The control of the SCA06 must be energized at the moment of installing the battery in the control card.

- Battery consumption with the servo drive energized: 1.5 µA.
- Battery consumption with the servo drive de-energized: 22 µA.
- Battery approximate duration with the servo drive de-energized: 01 year *.

* Consumption just for reference. For a precise estimate, contact the battery manufacturer.



1 – CR2032-type battery

Figure 7.1: *Battery location7*

Procedure for replacement:

1. Turn off the control and the power of the servo drive
2. Remove the accessory or cover of Slot 2 as shown in Figure 7.1 on page 7-3
3. Turn on the control of the SCA06 (power up the 24 V supply)
4. Remove the battery and put a new one
5. Turn off the control
6. Put the accessory or cover back on Slot 2

ATTENTION!
The battery must be installed with the control circuit powered up.

ATTENTION!
When using resources that use the battery (real time clock and retentive memory), it is advisable to activate the low battery alarm (refer to the programming manual).

NOTE
At the end of the useful life, do not dispose of the battery in common garbage, but in a proper place for batteries.

7.5 TECHNICAL ASSISTANCE CONTACT INFORMATION

NOTE!
For obtaining information or requesting service, it is important to have the following data at hand:
- Servo drive model.
- Serial number and manufacturing date contained on the product identification label (see section 2.4 IDENTIFICATION LABEL OF THE SCA06 on page 2-5).
- Firmware version installed (see P0023).
- Information about the application and programming executed.
- Servomotor model.

7.6 PREVENTIVE MAINTENANCE

DANGER!
- Always disconnect the general power supply before touching any electrical component part associated to the servo drive.
- High voltages can be present even after the disconnection of the power supply.
- Wait for at least 10 minutes for the complete discharge of the power capacitors or wait until the red Power on LED turns off.
- Always connect the frame of the equipment to the protective earth (PE) at the proper point.

DANGER!
- Débranchez toujours l'alimentation principale avant d'entrer en contact avec un appareil électrique associé à la servocommande.
- Il peut rester une tension élevée même après la déconnexion de l'alimentation électrique.
- Attendre au moins 10 minutes pour que les condensateurs se déchargent complètement ou attendre que la LED d'état rouge s'éteigne.
- Raccordez toujours la masse de l'appareil à une terre protectrice (PE).

ATTENTION!
The electronic cards have components sensitive to electrostatic discharges.

Do not touch directly the component parts or connectors. If necessary, first touch the grounded metallic frame or use a proper grounding strap.

Do not carry out any applied potential test in the servo drive!
If necessary, contact WEG.

When installed in proper environment and operating conditions, the servo drives require little service. Table 7.2 on page 7-5 lists the main procedures and intervals for routine maintenance.

Table 7.3 on page 7-5 lists the semiannual inspections suggested for the product after startup.

Table 7.2: Preventive maintenance

Maintenance		Interval	Instructions
Battery replacement		Every 10 years	Refer to section 7.4 BATTERY REPLACEMENT on page 7-2
Electrolytic capacitors	If the servo drive is stocked (out of operation): "Reforming"	Every year from the manufacturing date indicated on the identification label of the servo drive (refer to section 2.4 IDENTIFICATION LABEL OF THE SCA06 on page 2-5)	Supply the servo drive with single-phase or three-phase voltage between 220 and 230 Vac, 50 or 60 Hz, for at least one hour. Then de-energize and wait for at least 24 hours before using the servo drive
	Servo drive in operation	Every 10 years	Contact WEG technical assistance to obtain the procedure

Table 7.3: Periodical inspections every six months

Component Part	Abnormality	Corrective Action
Terminals, connectors	Loose screws	Tightening
	Loose connectors	
Ventilation system	Dirt on the fan	Cleaning
	Abnormal acoustic noise	Replace fan
	Fan stopped	
	Abnormal vibration	
	Dust on the panel air filters	Cleaning or replacement
Printed circuit cards	Building up of dust, oil, humidity, etc.	Cleaning
	Odor	Replacement
Power module / Power connections	Building up of dust, oil, humidity, etc.	Cleaning
	Loose screws	Tightening
Capacitors of the DC busbar (Intermediate circuit)	Electrolyte leak / discoloring / smell	Replacement
	Frame dilatation	
Power resistors	Discoloring	Replacement
	Smell	
Heatsink	Building up of dust	Cleaning
	Dirt	

7.6.1 Cleaning Instructions

When necessary to clean the servo drive, follow the directions below:

Ventilation system:

- Disconnect the control and power supply of the servo drive and wait for 10 minutes.
- Remove de dust accumulated on the ventilation openings using a plastic brush or cloth.
- Remove the dust accumulated on the fins of the heatsink and fan blades using compressed air.

Electronic card:

- Disconnect the control and power supply of the servo drive and wait for 10 minutes.
- Remove the dust accumulated on the cards using and anti-static brush or ion compressed air gun (Example: Charges Burtes Ion Gun (non nuclear) reference A6030-6DESCO).
- If necessary, remove the cards from the servo drive.
- Always use grounding strap.

8 OPTIONAL ITEMS AND ACCESSORIES

This chapter presents:

- Optional devices that may come from the factory with the servo drives:
  - Internal RFI suppressor filter.
  - Internal supply of the control circuit.
- Instructions to use the optional items.
- Accessories that may be added to the servo drives by the user.
- The peripherals that may be installed together with the SCA06.

The installation, operation and programming details of the accessories are presented in the respective manuals and are not included in this chapter.

8.1 OPTIONAL ITEMS

In order to ensure the proper operation, the optional cards are installed by the factory and must not be installed by the user. Some models cannot receive all the options presented. Table 9.1 on page 9-1 informs the optional items available for each servo drive model.

The servo drive code is presented in section 2.4 IDENTIFICATION LABEL OF THE SCA06 on page 2-5.

8.1.1 Internal RFI filter

The filter is available in models SCA06_____**C3**. Its function is to reduce the conducted disturbance of the servo drive to the power grid in the high frequency band (>150 kHz).

It is necessary so as to meet the maximum levels of conducted emission established by standards of electromagnetic compatibility, such as EN 61800-3 and EN 55011.

For the proper operation, it is necessary the installation of the servo drive, servomotor, cables, etc. as presented in section 3.2 ELECTRICAL INSTALLATION on page 3-6.

As this filter is composed of capacitors connected between the input phases and the Ground, there will be a leakage current. The value of the leakage current is listed in Table 8.1 on page 8-1. The residual differential interrupter (DR) must be dimensioned to stand the leakage current without actuating.

Table 8.1: *Leakage current of the internal RFI filter*

Model	Leakage Current
SCA06B05P0D2C3	30 mA
SCA06C08P0T2C3	
SCA06D16P0T2C3	
SCA06D24P0T2C3	
SCA06C05P3T4C3	
SCA06D14P0T4C3	
SCA06E30P0T4C3	100 mA

In case this leakage current is not desired, the EMC filter may be disabled by removing the screw, as shown in Figure 8.1 on page 8-2. In this case, the filter will remain inactive and the electromagnetic noise emission levels will be higher, and it can significantly interfere in equipment near or connected to the same power supply. WEG does not recommend this kind of installation.

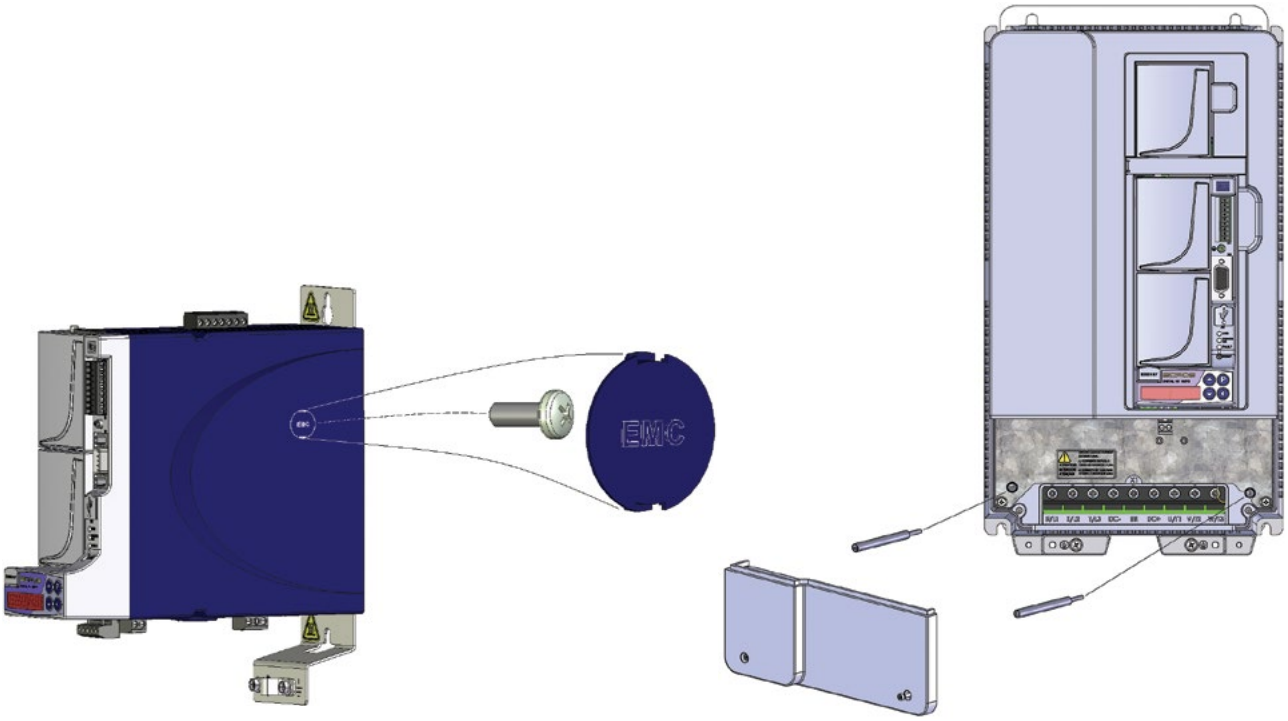


Figure 8.1: *Disconnection of the internal RFI filter*

8.1.2 Internal Control Supply

Servo drives with code SCA06_____**W2** feature control internal supply. This servo drive does not require an external control power supply (24 Vdc), that is, it must be used when separate control power supply is not desired. The servo drive itself generates a 24 Vdc supply and the user can also use it to supply small circuits, such as digital inputs, for instance. In this case, the connector X5 becomes a 24 Vdc output, with capacity of 500 mA to be used by the user. It is important to note that this supply has no feedback and, therefore, it is subject to variations due to the load.

In order to check if the control internal supply is mounted, parameter P00095 must be read.

8.2 ACCESSORIES

The accessories are incorporated to the servo drives in a simple and fast way by the use of the "Plug and Play" concept by the user. When an electronic accessory is connected to the slots, the control circuit identifies the model and informs the code of the accessory connected, in P00091, P00092 or P00093.

8

ATTENTION!
The accessories must be installed or removed with the servo drive de-energized. (Control and power).

The accessories may be purchased separately. They are sold in their own package, containing the component parts with detailed instructions for installation, operation and programming.

The accessories are connected to the three Slots available on the SCA06, as shown in Figure 8.2 on page 8-3. Each accessory has a fixation / grounding screw that must be tightened after fitting the accessory in the Slot.

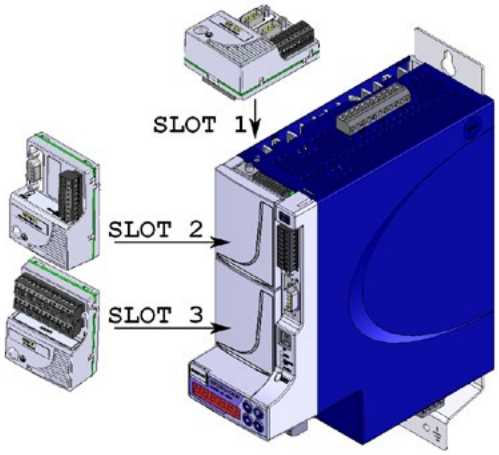
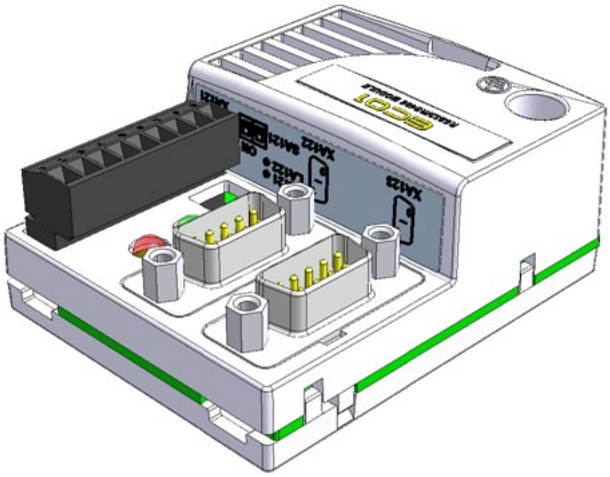


Figure 8.2: *Location of the Slots*

8.2.1 ECO1

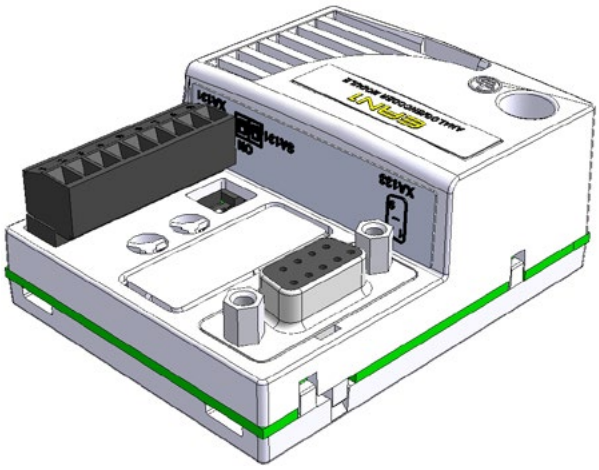


Available inputs and outputs:
- 1 isolated RS-232 serial communication port
- 1 isolated RS-485 serial communication port

Slot in which it may be installed:
Slot 1 or Slot 2

Figure 8.3: *Accessory ECO1*

8.2.2 EAN1

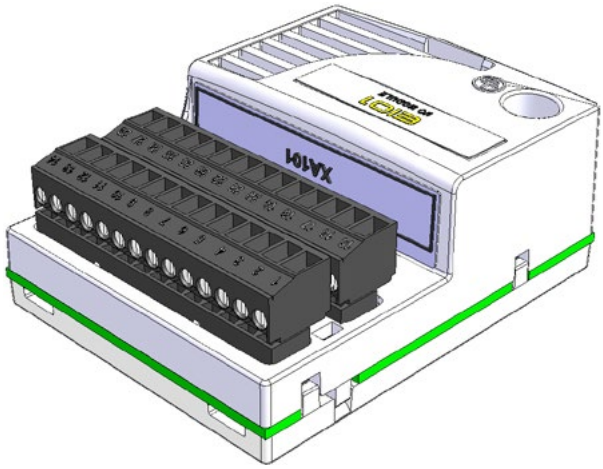


Available inputs and outputs:
- 1 encoder simulator output
- 1 14 bit analog input
- 3 digital inputs
- 1 digital output

Slot in which it may be installed:
Slot 3

Figure 8.4: *Accessory EAN1*

8.2.3 EIO1

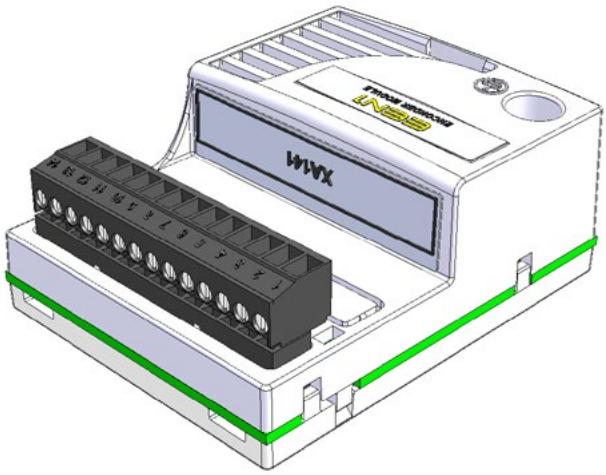


Available inputs and outputs:
- 12 digital inputs
- 3 relay digital outputs
- 3 opto-coupled digital outputs

Slot in which it may be installed:
Slot 1, Slot 2 or Slot 3

Figure 8.5: *Accessory EIO1*

8.2.4 EEN1

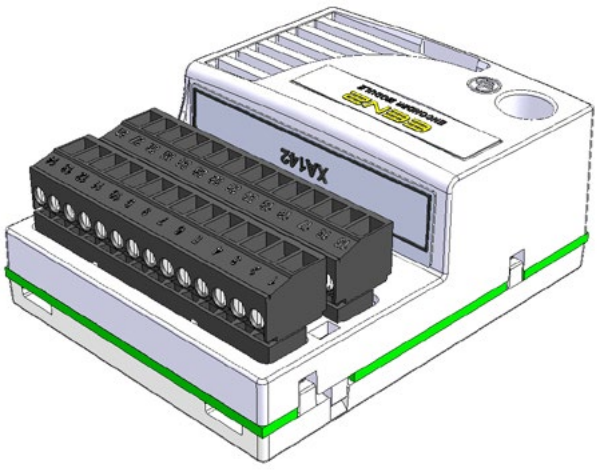


Available inputs and outputs:
- 1 Encoder input (5 ... 30 Vdc)

Slot in which it may be installed:
Slot 1, Slot 2 or Slot 3

Figure 8.6: *Accessories EEN1*

8.2.5 EEN2

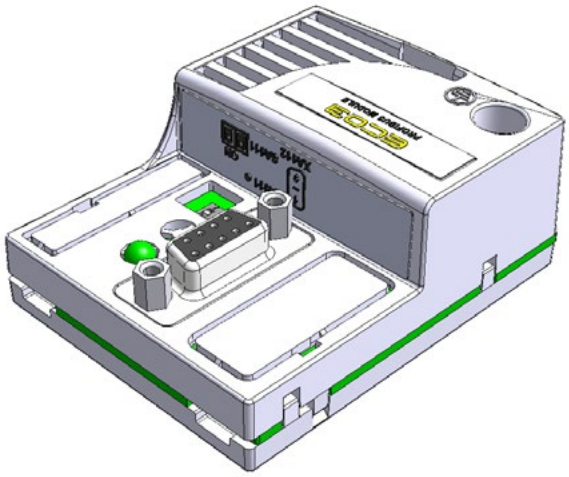


Available inputs and outputs:
- 2 Encoder Inputs (5 ... 30 Vdc)
- 1 Repeater output (voltage according to supply of 5 ... 30 Vdc)

Slot in which it may be installed:
Slot 1, Slot 2 or Slot 3

Figure 8.7: *Accessories EEN2*

8.2.6 ECO3



Available inputs and outputs:
- Profibus interface with terminal resistors

Slot in which it may be installed:
Slot 2

Figure 8.8: *Accessories ECO3*

8.3 PERIPHERALS

8.3.1 Servomotor

Technical specifications

- 04 frame sizes, 40 mm, 56 mm, 71 mm and 100 mm. (1.5 in, 2.2 in, 2.8 in and 3.9 in).
- 02 voltage ranges: 220...230 V and 380...480 V.
- Torque range from 0.8 to 50 N.m.
- Rated speed of 2000, 2800, 3000 and 6000 rpm.
- IP65 protection degree for standard line.
- IP54 protection degree for the line with electromagnetic brake.
- Natural cooling IC0041.
- Mounting in flange, horizontal position (B5 mounting) or vertical (V1 or V3).
- Feedback by Resolver, precision: ±10 minutes of arc (1° = 60 minutes of arc).
- Thermal protector (PTC).
- Shaft end with key NBR 6375.
- Rare earths magnets (Neodymium-Iron-Boron).
- Rolling bearing with permanent lubrication.
- Retainer for shaft sealing.
- Class F insulation.

Optional items

- Electromagnetic brake (external supply, 24 Vdc).
- Flange for ROD-type incremental encoder (under consultation).

Commercial specification

SWA 56 2 2.5 30 F

Frame
40
56
71
100

Voltage
2 = 220 ... 230 V
4 = 380 ... 480 V

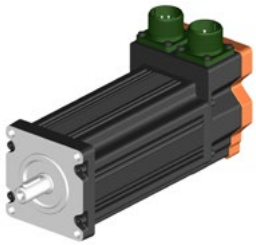
Torque
0.8 N.m
1.6 N.m
2.5 N.m
2.6 N.m
3.6 N.m
3.8 N.m
4.0 N.m
5.5 N.m
6.1 N.m
6.5 N.m
7.0 N.m
8.0 N.m
9.3 N.m
13 N.m
15 N.m
19 N.m
22 N.m
25 N.m
34 N.m
40 N.m
50 N.m

Rotation
20 = 2000 rpm
28 = 2800 rpm
30 = 3000 rpm
60 = 6000 rpm

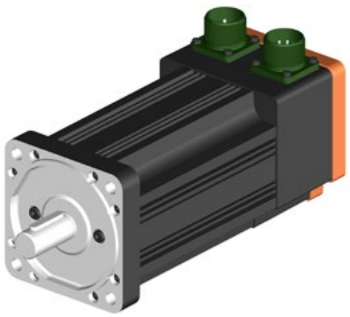
Options
Blank = No accessories
F = Electromagnetic brake
E = Incremental encoder
C0 = Straight connector
C9 = 90° connector
U = Electric characteristic (winding)
M = Mechanics characteristic (flange, shaft, etc.)

Servomotors Standard Line

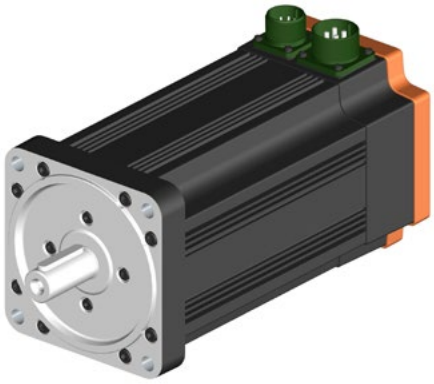
Standard line, without brake:



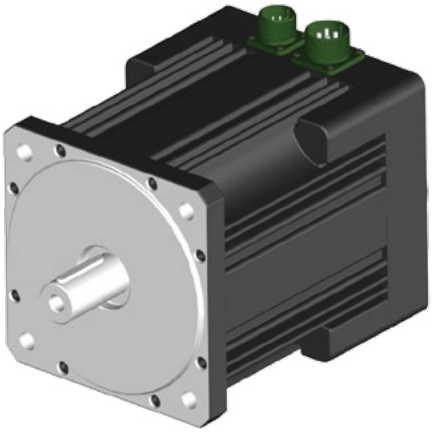
SWA 40_-__-__



SWA 56_-__-__

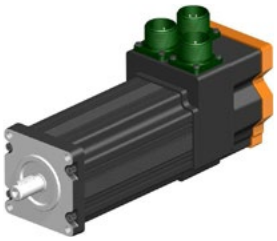


SWA 71_-__-__

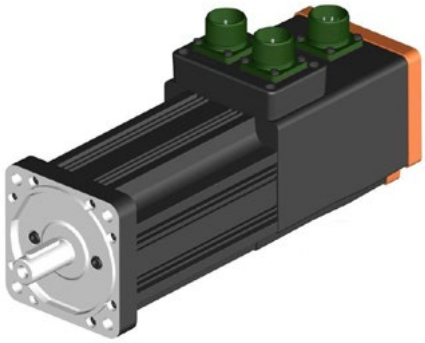


SWA 100_-__-__

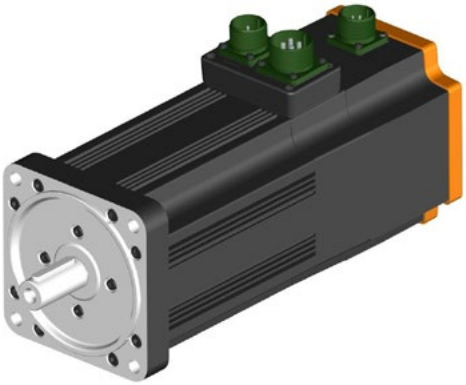
Standard line, with brake:



SWA 40_-__-__-F



SWA 56_-__-__-F



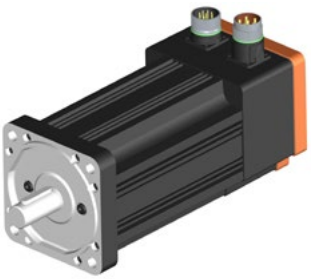
SWA 71_-__-__-F

8

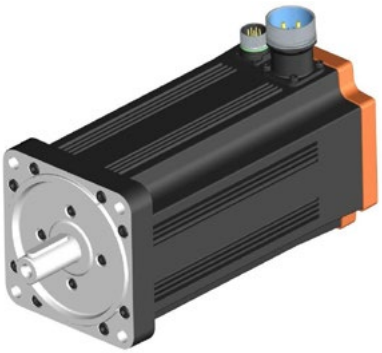
Servomotors CE line

CE line, without brake:

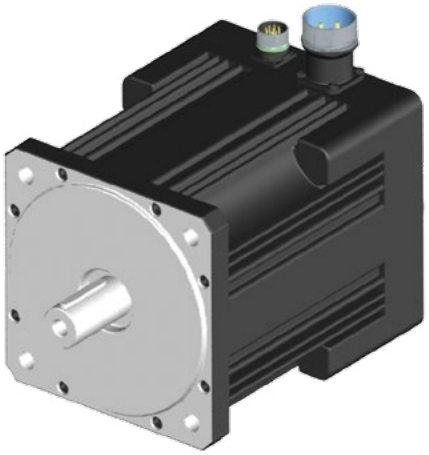
SWA 40_-__-__-C0



SWA 56_-__-__-C0



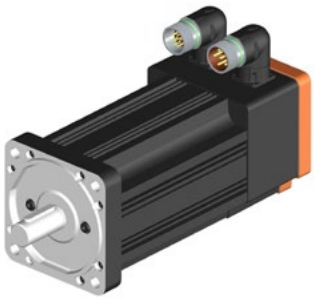
SWA 71_-__-__-C0



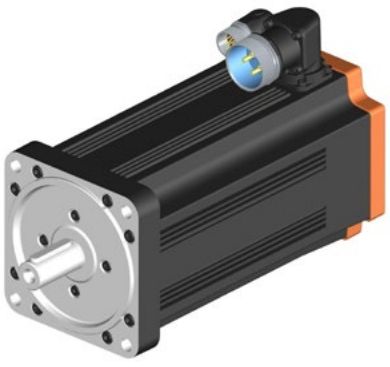
SWA 100_-__-__-C0

CE line, without brake and with 90° connector:

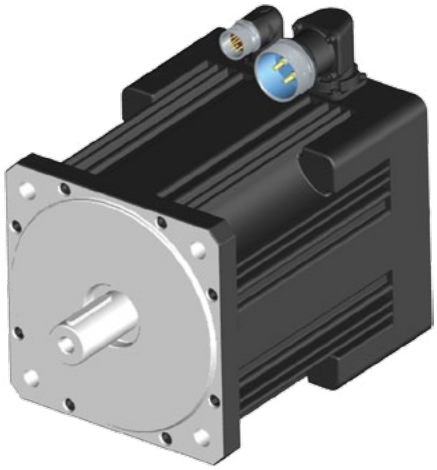
SWA 40_-__-__-C9



SWA 56_-__-__-C9

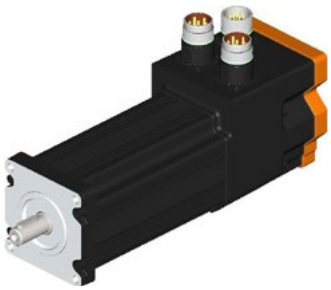


SWA 71_-__-__-C9

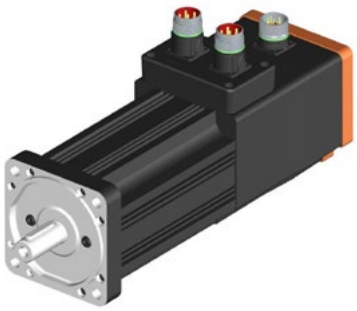


SWA 100_-__-__-C9

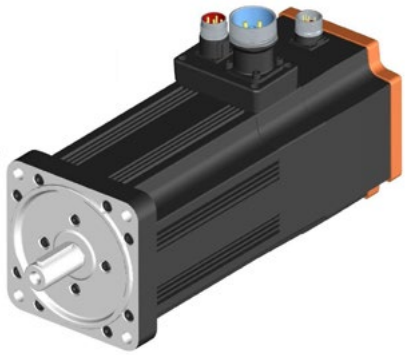
CE line, with brake:



SWA 40_-__-__-C0-F



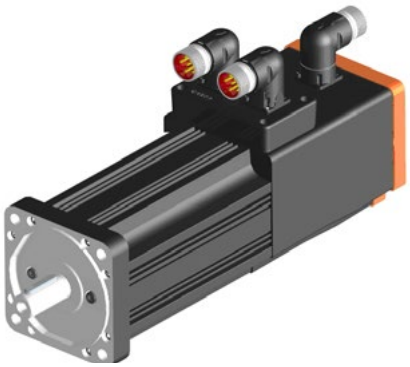
SWA 56_-__-__-C0-F



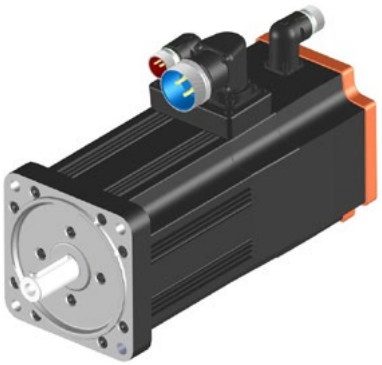
SWA 71_-__-__-C0-F

CE line, with brake and with 90° connector:

SWA 40_-__-__-C9-F



SWA 56_-__-__-C9-F



SWA 71_-__-__-C9-F

Figure 8.9: *Servomotor lines*

Table 8.2: Technical Data of the Servo Drives

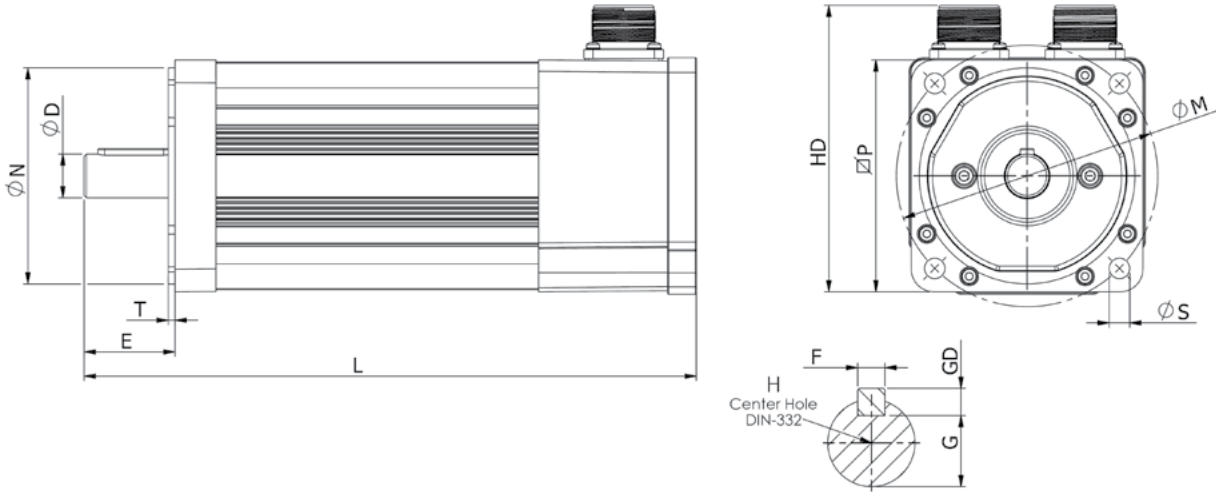
Technical Data - Servomotors standard line and CE line without electromagnetic brake

Voltage	Model	Rotation	Torque Blocked Mo	Current Io	Rated Power	Inertia	Weight	SCA06
V			N.m	Arms	kW	x10^{-3} kgm^2	kg	
220 ... 230 V	SWA 562-2.5-20-__	2000 rpm	2.5	2.5	0.36	0.22	4.6	SCA06B05P0
	SWA 562-3.8-20-__		3.8	3.8	0.70	0.31	5.6	
	SWA 562-6.1-20-__		6.1	5.2	1.10	0.50	7.5	SCA06C08P0
	SWA 562-8.0-20-__		8.0	6.5	1.32	0.68	9.3	
	SWA 712-9.3-20-__		9.3	8.0	1.60	1.63	12.0	
	SWA 712-13-20-__		13	11.8	2.30	2.35	15.0	SCA06D16P0
	SWA 712-15-20-__		15	13.0	2.50	3.07	17.0	
	SWA 712-19-20-__		19	15.1	2.90	3.79	20.0	
	SWA 712-22-20-__		22	18.5	3.40	4.50	22.0	SCA06D24P0
	SWA 712-25-20-__		25	21.5	3.40	5.94	27.0	
	SWA 402-0.8-30-__	3000 rpm	0.8	1.0	0.20	0.04	2.0	SCA06B05P0
	SWA 402-1.6-30-__		1.6	2.0	0.45	0.084	2.8	
	SWA 402-2.6-30-__		2.6	3.2	0.70	0.12	3.5	
	SWA 562-2.5-30-__		2.5	3.8	0.66	0.22	4.6	
	SWA 562-4.0-30-__		4.0	5.7	0.88	0.31	5.6	SCA06C08P0
	SWA 562-6.1-30-__		6.1	8.5	1.30	0.50	7.5	SCA06D16P0
	SWA 562-7.0-30-__		7.0	9.0	1.50	0.68	9.3	
	SWA 712-9.3-30-__		9.3	12.0	2.05	1.63	12.0	
	SWA 712-13-30-__		13	18.0	2.85	2.35	15.0	SCA06D24P0
	SWA 712-15-30-__		15	20.0	3.30	3.06	17.0	
	SWA 712-19-30-__		19	23.0	4.20	3.78	20.0	
	SWA 402-1.6-60-__	6000 rpm	1.6	4.0	0.70	0.084	2.8	SCA06B05P0
	SWA 402-2.6-60-__		2.6	6.2	1.13	0.12	3.5	SCA06C08P0
	SWA 562-2.5-60-__		2.5	7.5	1.13	0.22	4.6	
	SWA 562-3.6-60-__		3.6	10.3	1.60	0.31	5.6	SCA06D16P0
	SWA 562-5.5-60-__		5.5	15.5	2.40	0.50	7.5	
	SWA 562-6.5-60-__		6.5	16.3	2.50	0.68	9.3	SCA06D24P0
380 ... 480 V	SWA 564-6.1-20-__	2000 rpm	6.1	3.0	1.10	0.50	7.5	SCA06C05P3
	SWA 564-8.0-20-__		8.0	4.0	1.32	0.68	9.3	
	SWA 714-9.3-20-__		9.3	4.7	1.60	1.63	12.0	
	SWA 714-13-20-__		13	6.7	2.30	2.35	15.0	SCA06D14P0
	SWA 714-15-20-__		15	7.6	2.50	3.07	17.0	
	SWA 714-19-20-__		19	9.3	2.90	3.79	20.0	
	SWA 714-22-20-__		22	11.9	3.40	4.50	22.0	
	SWA 714-25-20-__		25	12.6	3.40	5.94	27.0	
	SWA 714-40-20-__		40	19.0	5.00	7.40	32.0	SCA06E30P0
	SWA 1004-50-28-__	2800 rpm	50	26.6	8.80	14.60	29.5	
	SWA 564-4.0-30-__	3000 rpm	4.0	3.2	0.88	0.31	5.6	SCA06C05P3
	SWA 564-6.1-30-__		6.1	5.0	1.30	0.50	7.5	
	SWA 564-7.0-30-__		7.0	5.1	1.50	0.68	9.3	
	SWA 714-9.3-30-__		9.3	6.8	2.05	1.63	12.0	SCA06D14P0
	SWA 714-13-30-__		13	10.3	2.58	2.35	15.0	
	SWA 714-15-30-__		15	11.3	3.30	3.07	17.0	
	SWA 714-19-30-__		19	13.4	4.20	3.79	20.0	
	SWA 714-34-30-__		34	25.0	4.30	5.94	27.0	SCA06E30P0
	SWA 404-2.6-60-__	6000 rpm	2.6	3.8	1.13	0.12	3.5	SCA06C05P3
	SWA 564-2.5-60-__		2.5	4.2	1.13	0.22	4.6	
	SWA 564-3.6-60-__		3.6	5.7	1.60	0.31	5.6	SCA06D14P0
	SWA 564-5.5-60-__		5.5	8.8	2.40	0.50	7.5	
	SWA 564-6.5-60-__		6.5	9.6	2.50	0.68	9.3	

Technical Data - Servomotors standard line and CE line with electromagnetic brake

Voltage	Model	Rotation	Torque Blocked Mo	Current Io	Rated Power	Inertia	Weight	SCA06
V			N.m	Arms	kW	x10^{-3} kgm²	kg	
220 ... 230 V	SWA 562-2.5-20-__-F	2000 rpm	2.5	2.5	0.36	0.35	6.5	SCA06B05P0
	SWA 562-3.8-20-__-F		3.8	3.8	0.70	0.44	7.5	
	SWA 562-6.1-20-__-F		6.1	5.2	1.10	0.63	9.4	SCA06C08P0
	SWA 562-8.0-20-__-F		8.0	6.5	1.32	0.81	11.2	
	SWA 712-9.3-20-__-F		9.3	8.0	1.60	2.10	16.1	
	SWA 712-13-20-__-F		13	11.8	2.30	2.84	19.1	SCA06D16P0
	SWA 712-15-20-__-F		15	13.0	2.50	3.55	21.1	
	SWA 712-19-20-__-F		19	15.1	2.90	4.27	24.1	
	SWA 712-22-20-__-F		22	18.5	3.40	4.99	26.1	SCA06D24P0
	SWA 712-25-20-__-F		25	21.5	3.40	6.43	31.1	
	SWA 402-0.8-30-__-F	3000 rpm	0.8	1.0	0.20	0.06	3.8	SCA06B05P0
	SWA 402-1.6-30-__-F		1.6	2.0	0.45	0.09	4.6	
	SWA 402-2.6-30-__-F		2.6	3.2	0.70	0.13	5.4	
	SWA 562-2.5-30-__-F		2.5	3.8	0.66	0.35	6.5	
	SWA 562-4.0-30-__-F		4.0	5.7	0.88	0.44	7.5	SCA06C08P0
	SWA 562-6.1-30-__-F		6.1	8.5	1.30	0.63	9.4	SCA06D16P0
	SWA 562-7.0-30-__-F		7.0	9.0	1.50	0.81	11.2	
	SWA 712-9.3-30-__-F		9.3	12.0	2.05	2.10	16.1	
	SWA 712-13-30-__-F		13	18.0	2.85	2.84	19.1	SCA06D24P0
	SWA 712-15-30-__-F		15	20.0	3.30	3.55	21.1	
	SWA 712-19-30-__-F		19	23.0	4.20	4.27	24.1	
	SWA 402-1.6-60-__-F	6000 rpm	1.6	4.0	0.70	0.09	4.6	SCA06C08P0
	SWA 402-2.6-60-__-F		2.6	6.2	1.13	0.13	5.4	
	SWA 562-2.5-60-__-F		2.5	7.5	1.13	0.35	6.5	
	SWA 562-3.6-60-__-F		3.6	10.3	1.60	0.44	7.5	SCA06D16P0
	SWA 562-5.5-60-__-F		5.5	15.5	2.40	0.63	9.4	
	SWA 562-6.5-60-__-F		6.5	16.3	2.50	0.81	11.2	SCA06D24P0
380 ...480 V	SWA 564-6.1-20-__-F	2000 rpm	6.1	3.0	1.10	0.63	9.4	SCA06C05P3
	SWA 564-8.0-20-__-F		8.0	4.0	1.32	0.81	11.2	
	SWA 714-9.3-20-__-F		9.3	4.7	1.60	2.10	16.1	
	SWA 714-13-20-__-F		13	6.7	2.30	2.84	19.1	SCA06D14P0
	SWA 714-15-20-__-F		15	7.6	2.50	3.55	21.1	
	SWA 714-19-20-__-F		19	9.3	2.90	4.27	24.1	
	SWA 714-22-20-__-F		22	11.9	3.40	4.99	26.1	
	SWA 714-25-20-__-F		25	12.6	3.40	6.43	31.1	
	SWA 714-40-20-__-F		40	19.0	5.00	7.88	36.1	SCA06E30P0
	SWA 564-4.0-30-__-F	3000 rpm	4.0	3.2	0.88	0.44	7.5	SCA06C05P3
	SWA 564-6.1-30-__-F		6.1	5.0	1.30	0.63	9.4	
	SWA 564-7.0-30-__-F		7.0	5.1	1.50	0.81	11.2	
	SWA 714-9.3-30-__-F		9.3	6.8	2.05	2.10	16.1	SCA06D14P0
	SWA 714-13-30-__-F		13	10.3	2.58	2.84	19.1	
	SWA 714-15-30-__-F		15	11.3	3.30	3.55	21.1	
	SWA 714-19-30-__-F		19	13.4	4.20	4.27	24.1	
	SWA 714-34-30-__-F		34	25.0	4.30	6.42	31.1	SCA06E30P0
	SWA 404-2.6-60-__-F	6000 rpm	2.6	3.8	1.13	0.12	5.4	SCA06C05P3
	SWA 564-2.5-60-__-F		2.5	4.2	1.13	0.35	6.5	
	SWA 564-3.6-60-__-F		3.6	5.7	1.60	0.44	7.5	SCA06D14P0
	SWA 564-5.5-60-__-F		5.5	8.8	2.40	0.63	9.4	
	SWA 564-6.5-60-__-F		6.5	9.6	2.50	0.81	11.2	

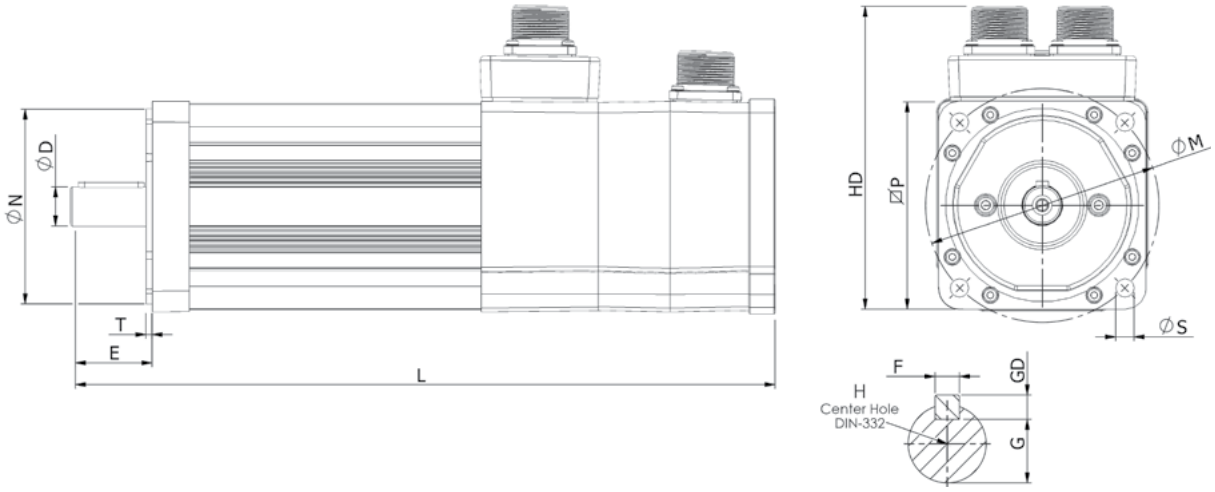
Dimensions – Standard servomotors without electromagnetic brake



Model	L mm	HD mm	ØP mm	Flange (mm)				Shaft end (mm)					
	(in)	(in)	(in)	ØM	ØN	ØS	T	ØD	E	F	G	GD	H
SWA 40_-0.8-30	190.0 (7.4)	118 (4.6)	80 (3.1)	95	50j6	6.5	2	14j6	29.5	5h9	11	5	M5x0.8x12
SWA 40_-1.6-30	216.7 (8.5)												
SWA 40_-2.6-30	236.7 (9.3)												
SWA 40_-1.6-60	216.7 (8.5)												
SWA 40_-2.6-60	236.7 (9.3)												
SWA 56_-2.5-20	250.0 (9.8)	127 (4.9)	102 (4.0)	115	95j6	9	3	19j6	40	6h9	15.5	6	M6x1x16
SWA 56_-3.8-20	270.0 (10.6)												
SWA 56_-6.1-20	310.0 (12.2)												
SWA 56_-8.0-20	350.0 (13.7)												
SWA 56_-2.5-30	250.0 (9.8)												
SWA 56_-4.0-30	270.0 (10.6)												
SWA 56_-6.1-30	310.0 (12.2)												
SWA 56_-7.0-30	350.0 (13.7)												
SWA 56_-2.5-60	250.0 (9.8)												
SWA 56_-3.6-60	270.0 (10.6)												
SWA 56_-5.5-60	310.0 (12.2)												
SWA 56_-6.5-60	350.0 (12.2)												
SWA 71_-9.3-20	270.5 (10.6)	166 (6.5)	142 (5.6)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-20	300.5 (11.8)												
SWA 71_-15-20	330.5 (13.0)												
SWA 71_-19-20	360.5 (14.1)												
SWA 71_-22-20	390.5 (15.3)												
SWA 71_-25-20	450.5 (17.7)												
SWA 71_-40-20	521.5 (20.5)							32j6	57	10	27	8	M12x1.75x25
SWA 100_-50-28	311.5 (12.3)	216	192	215	180j6	14	4	32k6					
SWA 71_-9.3-30	270.5 (10.64)	166 (6.5)	142 (5.6)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-30	300.5 (11.8)												
SWA 71_-15-30	330.5 (13.0)												
SWA 71_-19-30	360.5 (14.2)												
SWA 71_-34-30	461.5 (18.2)							32j6	57	10	27	8	M12x1.75x25

Figure 8.10: *Dimensions of the standard servomotor without electromagnetic brake*

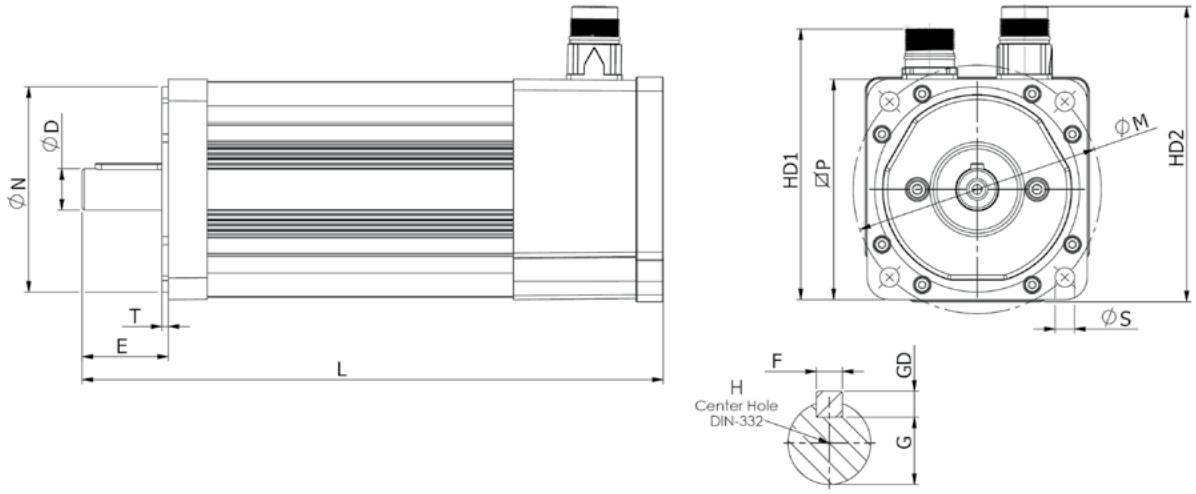
Dimensions - Standard servomotors with electromagnetic brake



Model	L mm	HD mm	ØP mm	Flange (mm)				Shaft end (mm)					
	(in)	(in)	(in)	ØM	ØN	ØS	T	ØD	E	F	G	GD	H
SWA 40_-0.8-30-F	243.0 (9.6)	118 (4.6)	80 (3.1)	95	50j6	6.5	2	14j6	29.5	5h9	11	5	M5x0.8x12
SWA 40_-1.6-30-F	263.0 (10.3)												
SWA 40_-2.6-30-F	283.0 (11.1)												
SWA 40_-1.6-60-F	263.0 (10.3)												
SWA 40_-2.6-60-F	283.0 (11.1)												
SWA 56_-2.5-20-F	323.5 (12.7)	158 (6.2)	102 (4.0)	115	95j6	9	3	19j6	40	6h9	15.5	6	M6x1x16
SWA 56_-3.8-20-F	343.5 (13.5)												
SWA 56_-6.1-20-F	383.5 (15.0)												
SWA 56_-8.0-20-F	423.5 (16.6)												
SWA 56_-2.5-30-F	323.5 (12.7)												
SWA 56_-4.0-30-F	343.5 (13.5)												
SWA 56_-6.1-30-F	383.5 (15.0)												
SWA 56_-7.0-30-F	423.5 (16.6)	158 (6.2)	102 (4.0)	115	95j6	9	3	19j6	40	6h9	15.5	6	M6x1x16
SWA 56_-2.5-60-F	323.5 (12.7)												
SWA 56_-3.6-60-F	343.5 (13.5)												
SWA 56_-5.5-60-F	383.5 (15.0)												
SWA 56_-6.5-60-F	423.5 (16.6)												
SWA 71_-9.3-20-F	367.0 (14.4)	197 (7.7)	142 (5.6)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-20-F	397.0 (15.6)												
SWA 71_-15-20-F	427.0 (16.8)												
SWA 71_-19-20-F	457.0 (17.9)												
SWA 71_-22-20-F	487.0 (19.1)												
SWA 71_-25-20-F	547.0 (21.5)												
SWA 71_-40-20-F	618.0 (24.3)							32j6	57	10	27	8	M12x1.75x25
SWA 71_-9.3-30-F	367.0 (14.4)							24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-30-F	397.0 (15.6)												
SWA 71_-15-30-F	427.0 (16.8)												
SWA 71_-19-30-F	457.0 (17.9)												
SWA 71_-34-30-F	558.0 (22.0)							32j6	57	10	27	8	M12x1.75x25

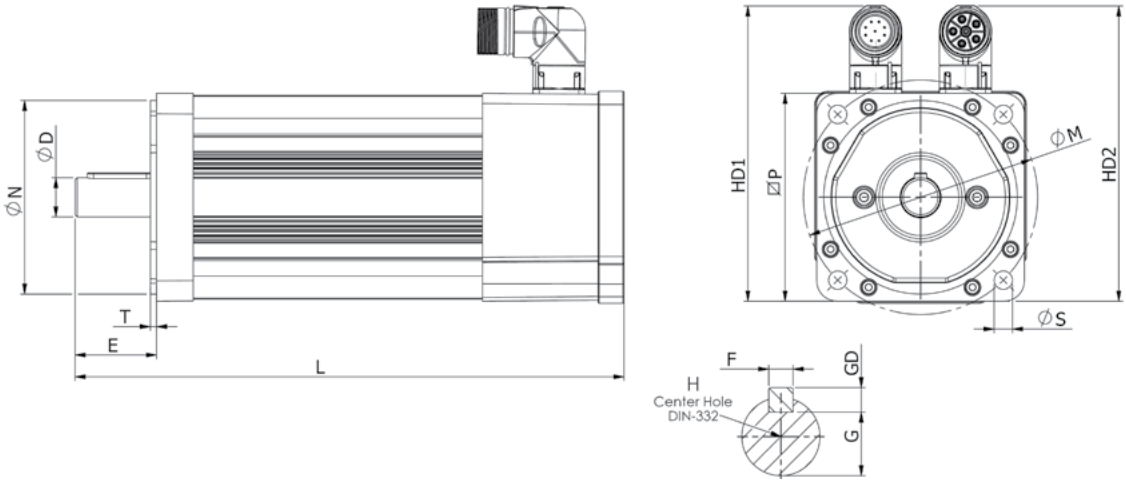
Figure 8.11: *Dimensions of the servomotor with electromagnetic brake*

Dimensions - CE servomotors without electromagnetic brake



Model	L mm	HD1 mm	HD2 mm	ØP mm	Flange (mm)				Shaft end (mm)					
	(in)	(in)	(in)	(in)	ØM	ØN	ØS	T	ØD	E	F	G	GD	H
SWA 40_-0.8-30-C0	190.0 (7.4)	120 (4.7)	130 (5.1)	80 (3.1)	95	50j6	6.5	2	14j6	29.5	5h9	11	5	M5x0.8x12
SWA 40_-1.6-30-C0	216.7 (8.5)													
SWA 40_-2.6-30-C0	236.7 (9.3)													
SWA 40_-1.6-60-C0	216.7 (8.5)	120 (4.7)	130 (5.1)	80 (3.1)	95	50j6	6.5	2	14j6	29.5	5h9	11	5	M5x0.8x12
SWA 40_-2.6-60-C0	236.7 (9.3)													
SWA 56_-2.5-20-C0	250.0 (9.8)	125 (4.9)	135 (5.3)	102 (4.0)	115	95j6	9	3	19j6	40	6h9	15.5	6	M6x1x16
SWA 56_-3.8-20-C0	270.0 (10.6)													
SWA 56_-6.1-20-C0	310.0 (12.2)													
SWA 56_-8.0-20-C0	350.0 (12.2)													
SWA 56_-2.5-30-C0	250.0 (9.8)													
SWA 56_-4.0-30-C0	270.0 (10.6)													
SWA 56_-6.1-30-C0	310.0 (12.2)													
SWA 56_-7.0-30-C0	350.0 (12.2)													
SWA 56_-2.5-60-C0	250.0 (9.8)													
SWA 56_-3.6-60-C0	270.0 (10.6)													
SWA 56_-5.5-60-C0	310.0 (12.2)													
SWA 56_-6.5-60-C0	350.0 (12.2)													
SWA 71_-9.3-20-C0	270.5 (10.6)	166 (6.5)	192 (7.6)	142 (5.6)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-20-C0	300.5 (11.8)													
SWA 71_-15-20-C0	330.5 (13.0)													
SWA 71_-19-20-C0	360.5 (14.1)													
SWA 71_-22-20-C0	390.5 (15.3)													
SWA 71_-25-20-C0	450.5 (17.7)													
SWA 71_-40-20-C0	521.5 (20.5)								32j6	57	10	27	8	M12x1.75x25
SWA 100_-50-28-C0	311.5 (12.3)	216	242	192	215	180j6	14	4	32k6					
SWA 71_-9.3-30-C0	270.5 (10.64)	166 (6.5)	192 (7.6)	142 (5.6)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-30-C0	300.5 (11.8)													
SWA 71_-15-30-C0	330.5 (13.0)													
SWA 71_-19-30-C0	360.5 (14.2)													
SWA 71_-34-30-C0	461.5 (18.2)								32j6	57	10	27	8	M12x1.75x25

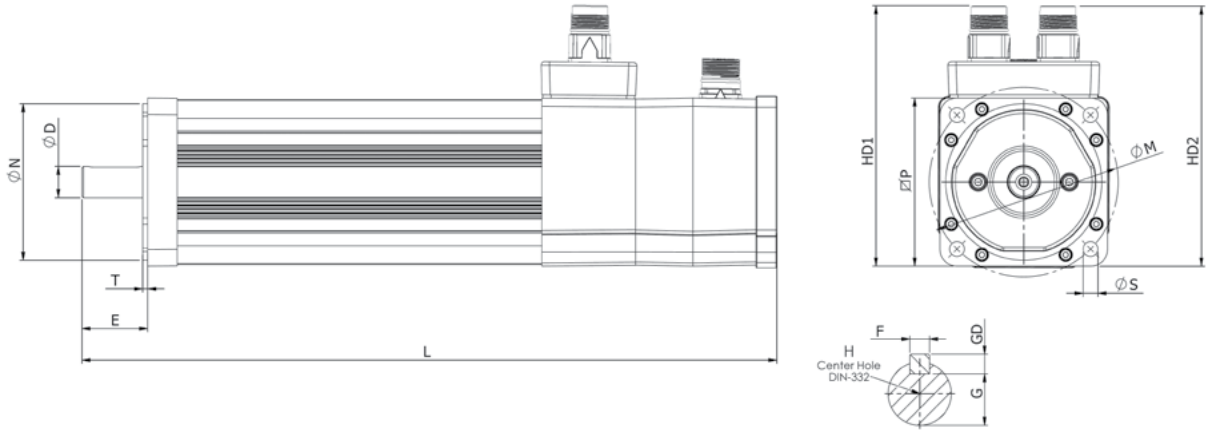
Figure 8.12: Dimensions of the CE servomotor without electromagnetic brake and connector 180°



Model	L mm	HD1 mm	HD2 mm	ØP mm	Flange (mm)				Shaft end (mm)					
	(in)	(in)	(in)	(in)	ØM	ØN	ØS	T	ØD	E	F	G	GD	H
SWA 40_-0.8-30-C9	190.0 (7.4)	138 (5.4)	138 (5.4)	80 (3.1)	95	50j6	6.5	2	14j6	29.5	5h9	11	5	M5x0.8x12
SWA 40_-1.6-30-C9	216.7 (8.5)													
SWA 40_-2.6-30-C9	236.7 (9.3)													
SWA 40_-1.6-60-C9	216.7 (8.5)													
SWA 40_-2.6-60-C9	236.7 (9.3)													
SWA 56_-2.5-20-C9	250.0 (9.8)	145 (5.7)	145 (5.7)	102 (4.0)	115	95j6	9	3	19j6	40	6h9	15.5	6	M6x1x16
SWA 56_-3.8-20-C9	270.0 (10.6)													
SWA 56_-6.1-20-C9	310.0 (12.2)													
SWA 56_-8.0-20-C9	350.0 (13.8)													
SWA 56_-2.5-30-C9	250.0 (9.8)													
SWA 56_-4.0-30-C9	270.0 (10.6)													
SWA 56_-6.1-30-C9	310.0 (12.2)													
SWA 56_-7.0-30-C9	350.0 (13.8)													
SWA 56_-2.5-60-C9	250.0 (9.8)													
SWA 56_-3.6-60-C9	270.0 (10.6)													
SWA 56_-5.5-60-C9	310.0 (12.2)													
SWA 56_-6.5-60-C9	350.0 (13.8)													
SWA 71_-9.3-20-C0	270.5 (10.6)	185 (7.3)	199 (7.9)	142 (5.6)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-20-C0	300.5 (11.8)													
SWA 71_-15-20-C0	330.5 (13.0)													
SWA 71_-19-20-C0	360.5 (14.1)													
SWA 71_-22-20-C0	390.5 (15.3)													
SWA 71_-25-20-C0	450.5 (17.7)													
SWA 71_-40-20-C0	521.5 (20.5)								32j6	57	10	27	8	M12x1.75x25
SWA 100_-50-28-C0	311.5 (12.3)	236	249	192	215	180j6	14	4	32k6					
SWA 71_-9.3-30-C0	270.5 (10.64)	185 (7.3)	199 (7.9)	142 (5.6)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-30-C0	300.5 (11.8)													
SWA 71_-15-30-C0	330.5 (13.0)													
SWA 71_-19-30-C0	360.5 (14.2)													
SWA 71_-34-30-C0	461.5 (18.2)								32j6	57	10	27	8	M12x1.75x25

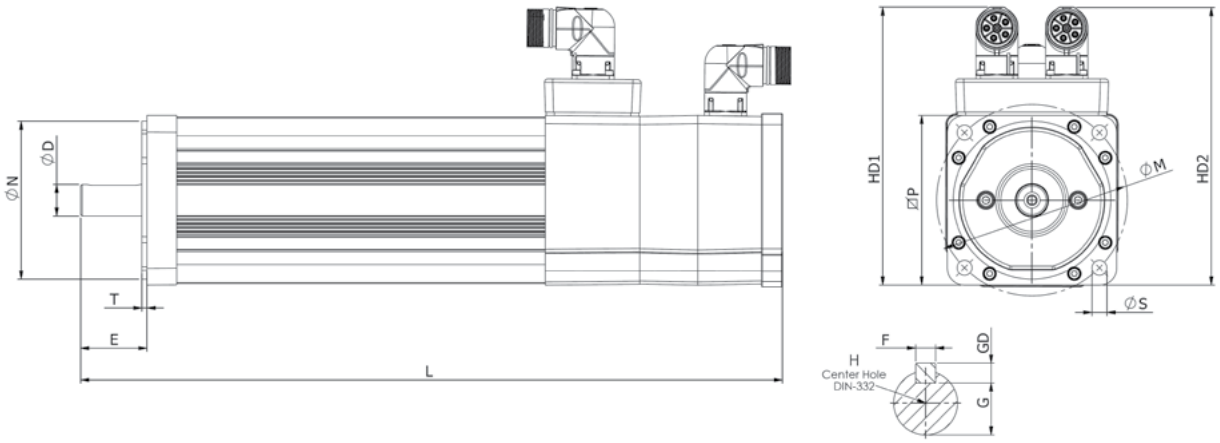
Figure 8.13: *Dimensions of the CE servomotor without electromagnetic brake and connector 90°*

Dimensions - CE Servomotors with electromagnetic brake



Model	L mm	HD1 mm	HD2 mm	ØP mm	Flange (mm)				Shaft end (mm)					
	(in)	(in)	(in)	(in)	ØM	ØN	ØS	T	ØD	E	F	G	GD	H
SWA 40_-0.8-30-C0-F	243.0 (9.5)	138 (5.4)	138 (5.4)	80 (3.1)	95	50j6	6.5	2	14j6	29.5	5h9	11	5	M5x0.8x12
SWA 40_-1.6-30-C0-F	263.0 (10.3)													
SWA 40_-2.6-30-C0-F	283.0 (11.1)													
SWA 40_-1.6-60-C0-F	263.0 (10.3)													
SWA 40_-2.6-60-C0-F	283.0 (11.1)													
SWA 56_-2.5-20-C0-F	323.5 (12.7)	158 (6.2)	158 (6.2)	102 (4.0)	115	95j6	9	3	19j6	40	6h9	15.5	6	M6x1x16
SWA 56_-3.8-20-C0-F	343.5 (13.5)													
SWA 56_-6.1-20-C0-F	383.5 (15.0)													
SWA 56_-8.0-20-C0-F	423.5 (16.6)													
SWA 56_-2.5-30-C0-F	323.5 (12.7)													
SWA 56_-4.0-30-C0-F	343.5 (13.5)													
SWA 56_-6.1-30-C0-F	383.5 (15.0)													
SWA 56_-7.0-30-C0-F	423.5 (16.6)													
SWA 56_-2.5-60-C0-F	323.5 (12.7)													
SWA 56_-3.6-60-C0-F	343.5 (13.5)	158 (6.2)	158 (6.2)	102 (4.0)	115	95j6	9	3	19j6	40	6h9	15.5	6	M6x1x16
SWA 56_-5.5-60-C0-F	383.5 (15.0)													
SWA 56_-6.5-60-C0-F	423.5 (16.6)													
SWA 71_-9.3-20-C0-F	367.0 (14.4)	197 (7.7)	213 (8.3)	142 (5.6)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-20-C0-F	397.0 (15.6)													
SWA 71_-15-20-C0-F	427.0 (16.8)													
SWA 71_-19-20-C0-F	457.0(17.9)													
SWA 71_-22-20-C0-F	487.0 (19.2)													
SWA 71_-25-20-C0-F	547.0 (21.5)													
SWA 71_-40-20-C0-F	618.0 (24.3)								32j6	57	10	27	8	M12x1.75x25
SWA 71_-9.3-30-C0-F	367.0 (14.4)								24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-30-C0-F	397.0 (15.6)													
SWA 71_-15-30-C0-F	427.0 (16.8)													
SWA 71_-19-30-C0-F	457.0 (17.9)													
SWA 71_-34-30-C0-F	558.0 (22.0)								32j6	57	10	27	8	M12x1.75x25

Figure 8.14: *Dimensions of the CE servomotor with electromagnetic brake and connector 180°*



Model	L mm	HD1 mm	HD2 mm	ØP mm	Flange (mm)				Shaft end (mm)					
	(in)	(in)	(in)	(in)	ØM	ØN	ØS	T	ØD	E	F	G	GD	H
SWA 40_-0.8-30-C9-F	243.0 (9.6)	138 (5.4)	138 (5.4)	80 (3.1)	95	50j6	6.5	2	14j6	29.5	5h9	11	5	M5x0.8x12
SWA 40_-1.6-30-C9-F	263.0 (10.3)													
SWA 40_-2.6-30-C9-F	283.0 (11.1)													
SWA 40_-1.6-60-C9-F	263.0 (10.3)													
SWA 40_-2.6-60-C9-F	283.0 (11.1)													
SWA 56_-2.5-20-C9-F	323.5 (12.7)	167 (6.5)	167 (6.5)	102 (4.0)	115	95j6	9	3	19j6	40	6h9	15.5	6	M6x1x16
SWA 56_-3.8-20-C9-F	343.5 (13.5)													
SWA 56_-6.1-20-C9-F	383.5 (15.1)													
SWA 56_-8.0-20-C9-F	423.5 (16.6)													
SWA 56_-2.5-30-C9-F	323.5 (12.7)													
SWA 56_-4.0-30-C9-F	343.5 (13.5)													
SWA 56_-6.1-30-C9-F	383.5 (15.1)													
SWA 56_-7.0-30-C9-F	423.5 (12.7)													
SWA 56_-2.5-60-C9-F	323.5 (12.7)													
SWA 56_-3.6-60-C9-F	343.5 (13.5)													
SWA 56_-5.5-60-C9-F	383.5 (15.1)													
SWA 56_-6.5-60-C9-F	423.5 (12.7)													
SWA 71_-9.3-20-C9-F	367.0 (14.4)	206 (8.1)	218 (8.5)	142 (5.5)	165	130j6	11	3.5	24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-20-C9-F	397.0 (15.6)													
SWA 71_-15-20-C9-F	427.0 (16.8)													
SWA 71_-19-20-C9-F	457.0 (17.9)													
SWA 71_-22-20-C9-F	487.0 (19.2)													
SWA 71_-25-20-C9-F	547.0 (21.5)													
SWA 71_-40-20-C9-F	618.0 (24.3)								32j6	57	10	27	8	M12x1.75x25
SWA 71_-9.3-30-C9-F	367.0 (14.4)								24j6	50	8h9	20	7	M8x1.25x19
SWA 71_-13-30-C9-F	397.0 (15.6)													
SWA 71_-15-30-C9-F	427.0 (16.8)													
SWA 71_-19-30-C9-F	457.0 (17.9)													
SWA 71_-34-30-C9-F	558.0 (22.0)								32j6	57	10	27	8	M12x1.75x25

Figure 8.15: *Dimensions of the CE servomotor with electromagnetic brake and connector 90°*

8.3.2 Cables for Servomotors

The cables available for servomotors are divided into two groups: Cables for fixed installation and cables for movement.

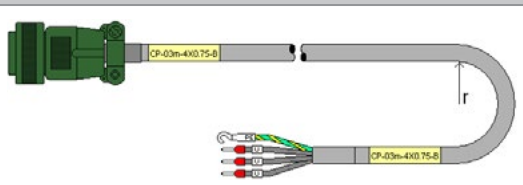
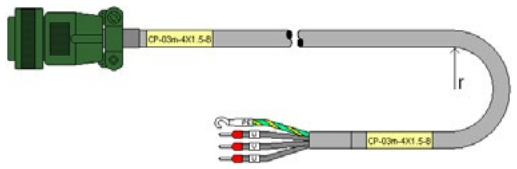
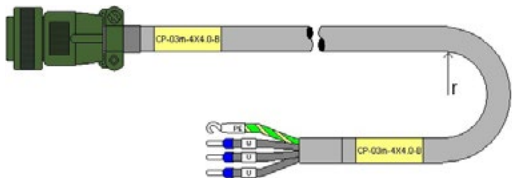
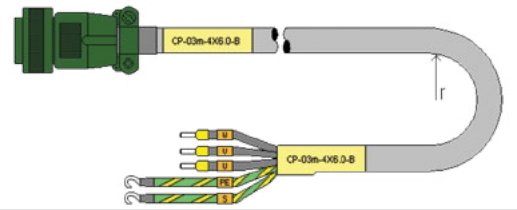
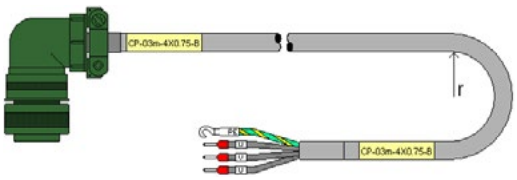
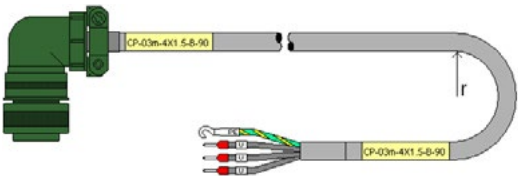
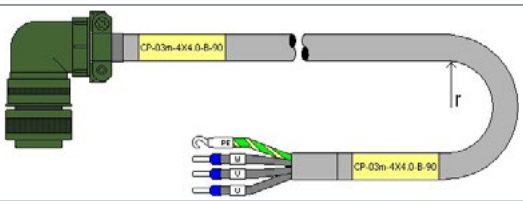
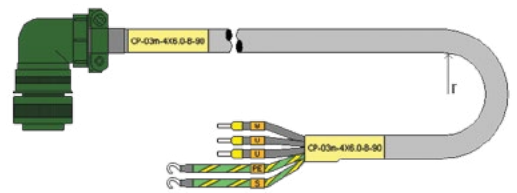
CABLES FOR FIXED INSTALLATION

Characteristics:

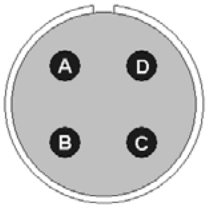
- Fixed installation.
- Electromagnetic shield.
- Highly oil and chemicals resistant.
- Free of silicone.
- Flame retardant according to standard IEC 60332-1-2.
- Application in temperatures of -40 °C to +80 °C (-40 °F to 176 °F).
- Power cable with CE and ROHS approval.
- Resolver cable with ROHS approval.

Cables for servomotors standard line:

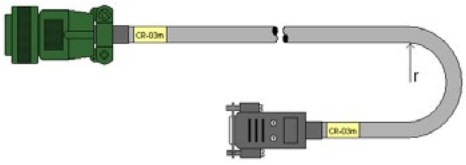
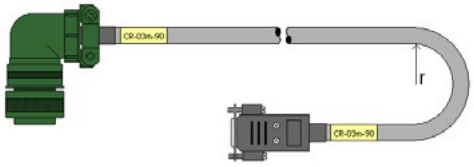
Power Cables

Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
CP-03m-4x0.75-B	03 m (9.8 ft)	-	42 mm (1.6 in)	7.0 mm (0.2 in)	
CP-06m-4x0.75-B	06 m (19.6 ft)				
CP-09m-4x0.75-B	09 m (29.5 ft)				
CP-12m-4x0.75-B	12 m (39.3 ft)				
CP-15m-4x0.75-B	15 m (49.2 ft)				
CP-03m-4x1.5-B	03 m (9.8 ft)	-	50 mm (1.9 in)	8.2 mm (0.3 in)	
CP-06m-4x1.5-B	06 m (19.6 ft)				
CP-09m-4x1.5-B	09 m (29.5 ft)				
CP-12m-4x1.5-B	12 m (39.3 ft)				
CP-15m-4x1.5-B	15 m (49.2 ft)				
CP-03m-4x4.0-B	03 m (9.8 ft)	-	70 mm (2.7 in)	11.6 mm (0.4 in)	
CP-06m-4x4.0-B	06 m (19.6 ft)				
CP-09m-4x4.0-B	09 m (29.5 ft)				
CP-12m-4x4.0-B	12 m (39.3 ft)				
CP-15m-4x4.0-B	15 m (49.2 ft)				
CP-03m-4x6.0-B	03 m (9.8 ft)	-	85 mm (3.3 in)	14.2 mm (0.6 in)	
CP-06m-4x6.0-B	06 m (19.6 ft)				
CP-09m-4x6.0-B	09 m (29.5 ft)				
CP-12m-4x6.0-B	12 m (39.3 ft)				
CP-15m-4x6.0-B	15 m (49.2 ft)				
CP-03m-4x0.75-B-90	03 m (9.8 ft)	-	42 mm (1.6 in)	7.0 mm (0.2 in)	
CP-06m-4x0.75-B-90	06 m (19.6 ft)				
CP-09m-4x0.75-B-90	09 m (29.5 ft)				
CP-12m-4x0.75-B-90	12 m (39.3 ft)				
CP-15m-4x0.75-B-90	15 m (49.2 ft)				
CP-03m-4x1.5-B-90	03 m (9.8 ft)	-	50 mm (1.9 in)	8.2 mm (0.3 in)	
CP-06m-4x1.5-B-90	06 m (19.6 ft)				
CP-09m-4x1.5-B-90	09 m (29.5 ft)				
CP-12m-4x1.5-B-90	12 m (39.3 ft)				
CP-15m-4x1.5-B-90	15 m (49.2 ft)				
CP-03m-4x4.0-B-90	03 m (9.8 ft)	-	70 mm (2.7 in)	11.6 mm (0.4 in)	
CP-06m-4x4.0-B-90	06 m (19.6 ft)				
CP-09m-4x4.0-B-90	09 m (29.5 ft)				
CP-12m-4x4.0-B-90	12 m (39.3 ft)				
CP-15m-4x4.0-B-90	15 m (49.2 ft)				
CP-03m-4x6.0-B-90	03 m (9.8 ft)	-	85 mm (3.3 in)	14.2 mm (0.6 in)	
CP-06m-4x6.0-B-90	06 m (19.6 ft)				
CP-09m-4x6.0-B-90	09 m (29.5 ft)				
CP-12m-4x6.0-B-90	12 m (39.3 ft)				
CP-15m-4x6.0-B-90	15 m (49.2 ft)				

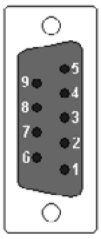
Pinout:

Servomotor		SCA06
	A	U
	B	V
	C	W
	D	PE (GROUND)

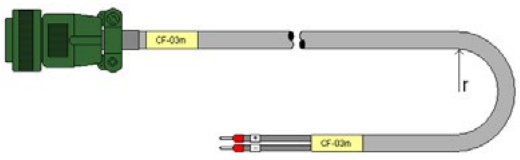
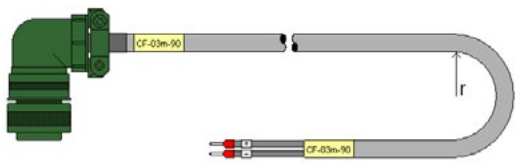
Resolver Cables

Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
CR-03m	03 m (9.8 ft)	-	33.2 mm (1.3 in)	8.3 mm (0.3 in)	
CR-06m	06 m (19.6 ft)				
CR-09m	09 m (29.5 ft)				
CR-12m	12 m (39.3 ft)				
CR-15m	15 m (49.2 ft)				
CR-03m-90	03 m (9.8 ft)	-	33.2 mm (1.3 in)	8.3 mm (0.3 in)	
CR-06m-90	06 m (19.6 ft)				
CR-09m-90	09 m (29.5 ft)				
CR-12m-90	12 m (39.3 ft)				
CR-15m-90	15 m (49.2 ft)				

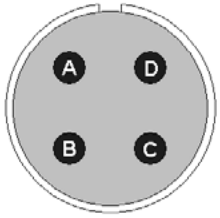
Pinout:

Servomotor		Function	SCA06	
	A	- COS	1	
	B	+ COS	7	
	C	+ SEN	8	
	D	GND	9	
	E	- SEN	3	
	F	+ OSC	5	
	G	+5 V	2	
	H	PTC	6	
	I	Not connected / Internal shields	4	
	J	External shields	frame	

Cables for brake:

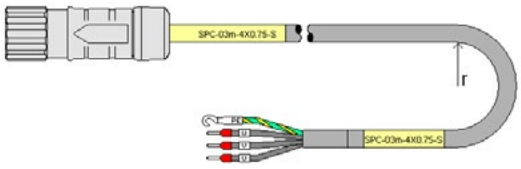
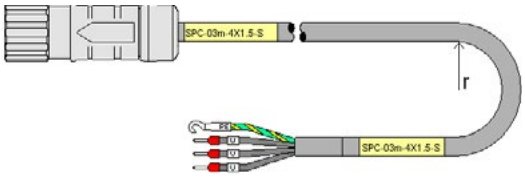
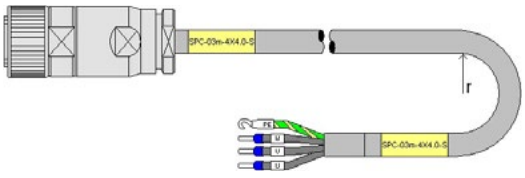
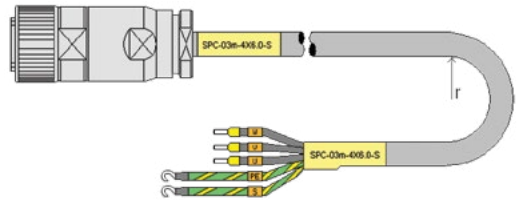
Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
CF-03m	03 m (9.8 ft)	-	25 mm (0.9 in)	6.2 mm (0.2 in)	
CF-06m	06 m (19.6 ft)				
CF-09m	09 m (29.5 ft)				
CF-12m	12 m (39.3 ft)				
CF-15m	15 m (49.2 ft)				
CF-03m-90	03 m (9.8 ft)	-	25 mm (0.9 in)	6.2 mm (0.2 in)	
CF-06m-90	06 m (19.6 ft)				
CF-09m-90	09 m (29.5 ft)				
CF-12m-90	12 m (39.3 ft)				
CF-15m-90	15 m (49.2 ft)				

Pinout:

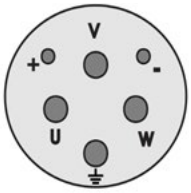
Servomotor		Supply +24 Vdc
	A	+
	B	-
	C	Not connected
	D	Not connected

Cables for servomotors CE line:

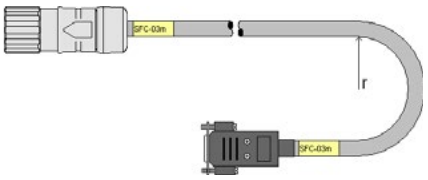
Power cables:

Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
SPC-03m-4x0.75-S	03 m (9.8 ft)	-	42 mm (1.6 in)	7.0 mm (2.7 in)	
SPC-06m-4x0.75-S	06 m (19.6 ft)				
SPC-09m-4x0.75-S	09 m (29.5 ft)				
SPC-12m-4x0.75-S	12 m (39.3 ft)				
SPC-15m-4x0.75-S	15 m (49.2 ft)				
SPC-03m-4x1.5-S	03 m (9.8 ft)	-	50 mm (1.9 in)	8.2 mm (0.3 in)	
SPC-06m-4x1.5-S	06 m (19.6 ft)				
SPC-09m-4x1.5-S	09 m (29.5 ft)				
SPC-12m-4x1.5-S	12 m (39.3 ft)				
SPC-15m-4x1.5-S	15 m (49.2 ft)				
SPC-03m-4x4.0-S	03 m (9.8 ft)	-	70 mm (2.7 in)	11.6 mm (0.4 in)	
SPC-06m-4x4.0-S	06 m (19.6 ft)				
SPC-09m-4x4.0-S	09 m (29.5 ft)				
SPC-12m-4x4.0-S	12 m (39.3 ft)				
SPC-15m-4x4.0-S	15 m (49.2 ft)				
SPC-03m-4x6.0-S	03 m (9.8 ft)	-	85 mm (3.3 in)	14.2 mm (0.6 in)	
SPC-06m-4x6.0-S	06 m (19.6 ft)				
SPC-09m-4x6.0-S	09 m (29.5 ft)				
SPC-12m-4x6.0-S	12 m (39.3 ft)				
SPC-15m-4x6.0-S	15 m (49.2 ft)				

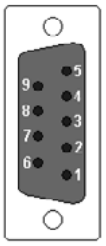
Pinout:

Servomotor		SCA06
	1	U
	2	V
	⏚	PE (GROUND)
	4	W
	5	Not connected
	6	Not connected
	U	U
	V	V
	W	W
	⏚	PE (GROUND)
	+	Not connected
	-	Not connected

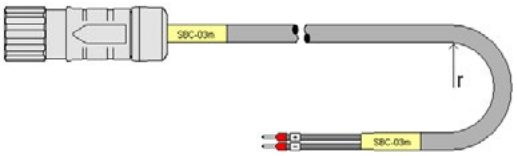
Resolver Cables

Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
SFC-03m	03 m (9.8 ft)	-	33.2 mm (1.3 in)	8.3 mm (0.3 in)	
SFC-06m	06 m (19.6 ft)				
SFC-09m	09 m (29.5 ft)				
SFC-12m	12 m (39.3 ft)				
SFC-15m	15 m (49.3 ft)				

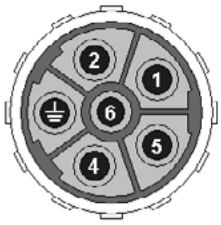
Pinout:

Servomotor		Function	SCA06	
	1	Not connected		
	2	- COS	1	
	3	+ COS	7	
	4	+ SEN	8	
	5	GND	9	
	6	- SEN	3	
	7	+ OSC	5	
	8	+5 V	2	
	9	PTC	6	
		Internal Shields	4	
	frame	External Shields	frame	

Cables for brake:

Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
SBC-03m	03 m (9.8 ft)	-	42 mm (1.6 in)	7.0 mm (0.3 in)	
SBC-06m	06 m (19.6 ft)				
SBC-09m	09 m (29.5 ft)				
SBC-12m	12 m (39.3 ft)				
SBC-15m	15 m (49.3 ft)				

Pinout:

Servomotor		Supply +24 Vdc
	1	+
	2	-
	⏚	Not connected
	4	Not connected
	5	Not connected
	6	Not connected

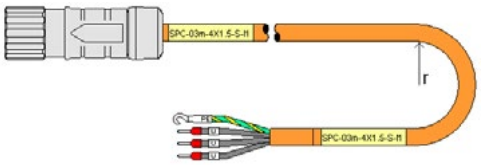
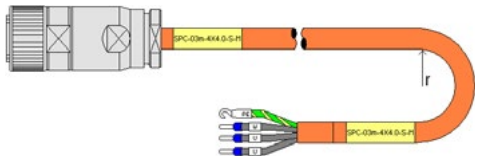
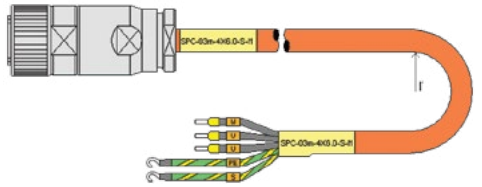
CABLES FOR INSTALLATION WITH CABLE MOVEMENT

Characteristics:

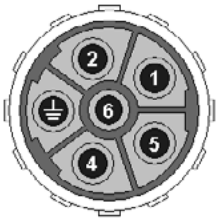
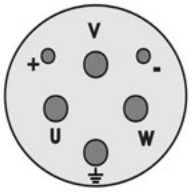
- Flexing installation (cable carrier).
- Electromagnetic shield.
- Humidity resistant.
- Oil resistant.
- Highly wear resistance.
- Flame retardant and self-extinguishing (according to standard IEC 60332-1-2, UL FT 1).
- Application in temperatures of -40 °C to +80 °C (-40 °F to 176 °F).
- Cables with CE, UL and ROHS approval.
- Cables with DESINA standard.

Cables for servomotors CE line:

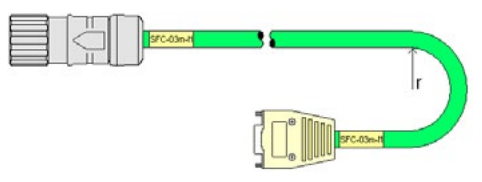
Power cables:

Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
SPC-03m-4x1.5-S-M	03 m (9.8 ft)	120 mm (4.7 in)	40 mm (1.6 in)	10 mm (0.4 in)	
SPC-06m-4x1.5-S-M	06 m (19.6 ft)				
SPC-09m-4x1.5-S-M	09 m (29.5 ft)				
SPC-12m-4x1.5-S-M	12 m (39.3 ft)				
SPC-15m-4x1.5-S-M	15 m (49.3 ft)				
SPC-03m-4x4.0-S-M	03 m (9.8 ft)	160 mm (6.3 in)	53 mm (2.1 in)	13.1 mm (0.5 in)	
SPC-06m-4x4.0-S-M	06 m (19.6 ft)				
SPC-09m-4x4.0-S-M	09 m (29.5 ft)				
SPC-12m-4x4.0-S-M	12 m (39.3 ft)				
SPC-15m-4x4.0-S-M	15 m (49.3 ft)				
SPC-03m-4x6.0-S-M	03 m (9.8 ft)	184 mm (7.3 in)	62 mm (2.4 in)	15.3 mm (0.6 in)	
SPC-06m-4x6.0-S-M	06 m (19.6 ft)				
SPC-09m-4x6.0-S-M	09 m (29.5 ft)				
SPC-12m-4x6.0-S-M	12 m (39.3 ft)				
SPC-15m-4x6.0-S-M	15 m (49.2 ft)				

Pinout:

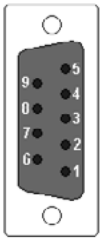
Servomotor		SCA06
	1	U
	2	V
	⏚	PE (GROUND)
	4	W
	5	Not connected
	6	Not connected
	U	U
	V	V
	W	W
	⏚	PE (GROUND)
	+	Not connected
	-	Not connected

Resolver Cables

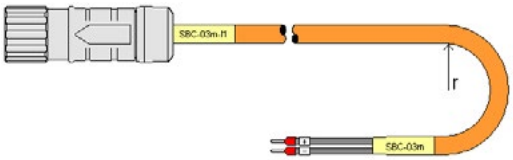
Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
SFC-03m-M	03 m (9.8 ft)	90 mm (3.5 in)	67.5 mm (2.6 in)	9 mm (0.3 in)	
SFC-06m-M	06 m (19.6 ft)				
SFC-09m-M	09 m (29.5 ft)				
SFC-12m-M	12 m (39.3 ft)				
SFC-15m-M	15 m (49.3 ft)				

Pinout:

Servomotor		Function	SCA06
	1	Not connected	
	2	- COS	1
	3	+ COS	7
	4	+ SEN	8
	5	GND	9
	6	- SEN	3
	7	+ OSC	5
	8	+5 V	2
	9	PTC	6
		Internal shields	4
	Frame	External shields	Frame



Cables for brake:

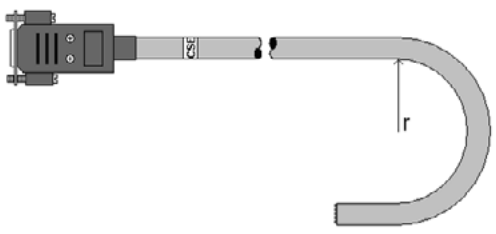
Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
SBC-03m-M	03 m (9.8 ft)	120 mm (4.7 in)	40 mm (1.5 in)	10 mm (0.3 in)	
SBC-06m-M	06 m (19.6 ft)				
SBC-09m-M	09 m (29.5 ft)				
SBC-12m-M	12 m (39.3 ft)				
SBC-15m-M	15 m (49.3 ft)				

Pinout:

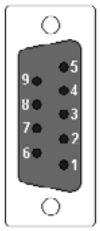
Servomotor		Supply +24 Vdc
	1	+
	2	-
	⏚	Not connected
	4	Not connected
	5	Not connected
	6	Not connected

CABLES FOR ENCODER SIMULATOR

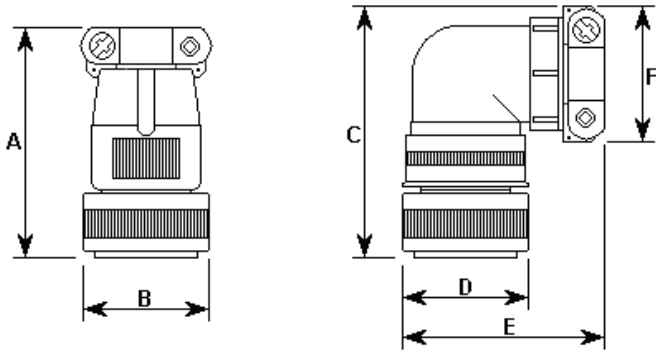
Note: In order to use the encoder simulator, the EAN 1 accessory must be installed (see item 8.2.2 EAN1 on page 8-3).

Models	Length	Curvature "r"		Cable Diameter	Drawing
		Flexing	Fixed		
CSE-02 m	02 m (6.5 ft)	-	33.2 mm (1.3 in)	8.3 mm (0.3 in)	

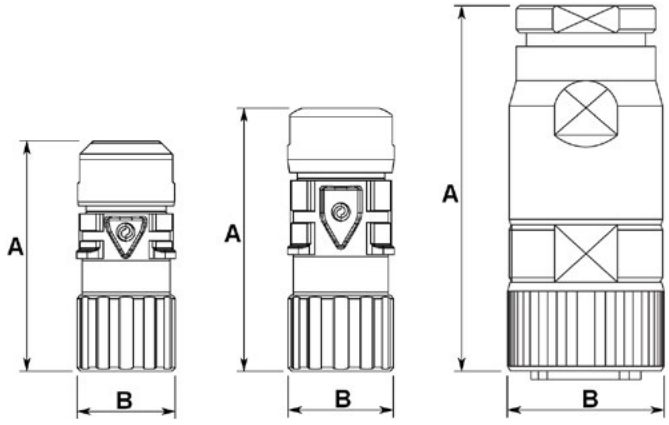
Pinout:

SCA06		Signal
	1	B
	2	AN
	3	A
	4	+5 Vdc to +24 Vdc (+20 %)
	5	Not connected
	6	-V (0 V)
	7	NN
	8	N
	9	BN
	Frame	Cable shield

CONNECTOR DIMENSIONS



Dimension	Cable Connectors: CP - _____ - 4x0.75 - B - _____ CP - _____ - 4x1.5 - B - _____ CR - _____ CF - _____		Cable Connectors: CP - _____ - 4x4.0 - B - _____	
	mm	in	mm	in
A	65.94	2.6	67.41	2.65
B	33.86	1.33	40.34	1.59
C	69.30	2.73	77.61	3.05
D	33.86	1.33	40.34	1.59
E	61.61	2.42	70.79	2.79
F	31.22	1.23	33.57	1.48



Dimension	Cable Connectors: SFC - ___ - ___ SBC - ___ - ___		Cable Connectors: SPC - ___ - 4x1.5 - S - ___		Cable Connectors: SPC - ___ - 4x4.0 - S - ___	
	mm	in	mm	in	mm	in
A	58 (min.)	2.28 (min.)	67 ... 72	2.64 ... 2.83	110	4.33
B	∅26	∅1.02	∅28	∅1.10	∅46	1.81

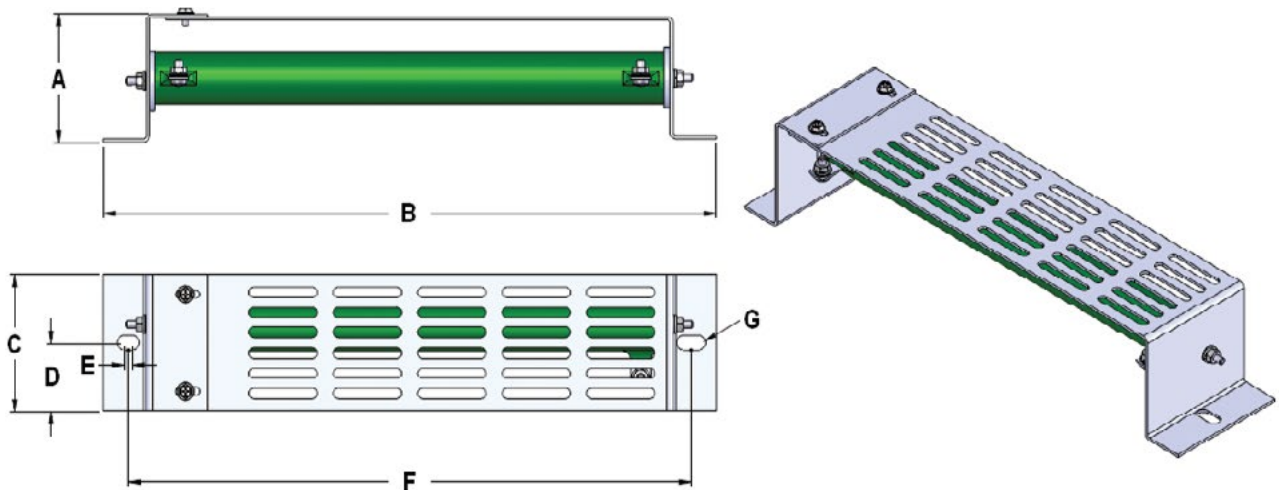
Figure 8.16: *Connector dimensions*

8.3.3 Braking Resistor RF200

Data:

Code	Resistance	Max. Voltage	Power	Energy	Ambient Temp.	Max. Temp.
11015202	30 Ω	600 V	200 W	2200 J	50 °C (122 °F)	400 °C (752 °F)

Dimensions:



A	B	C	D	E	F	G
mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm
64 (2.52)	305 (12.00)	68 (2.68)	34 (1.34)	4 (0.16)	280 (11.02)	M6

Figure 8.17: *Dimensions of the braking resistor RF200*

8.3.4 External RFI Filter

Typical circuit:

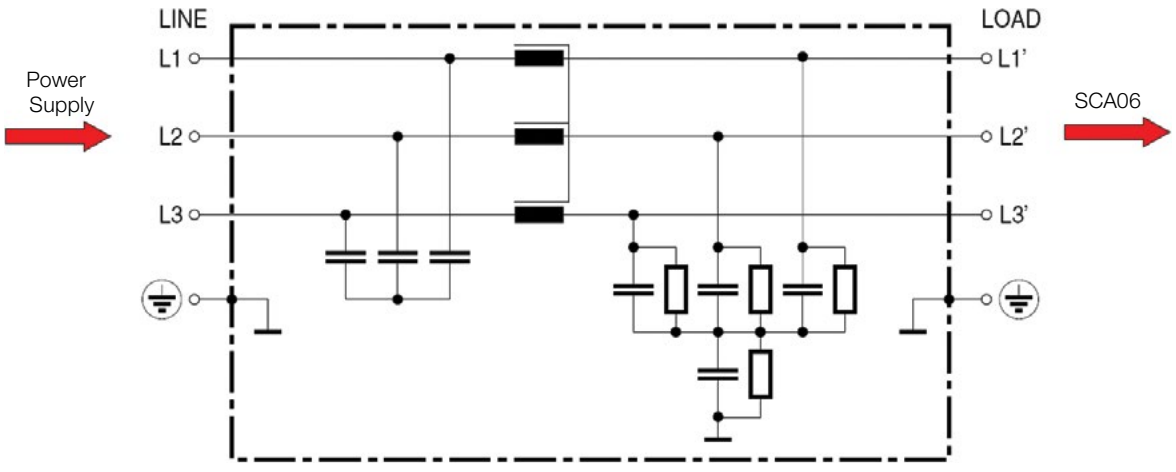
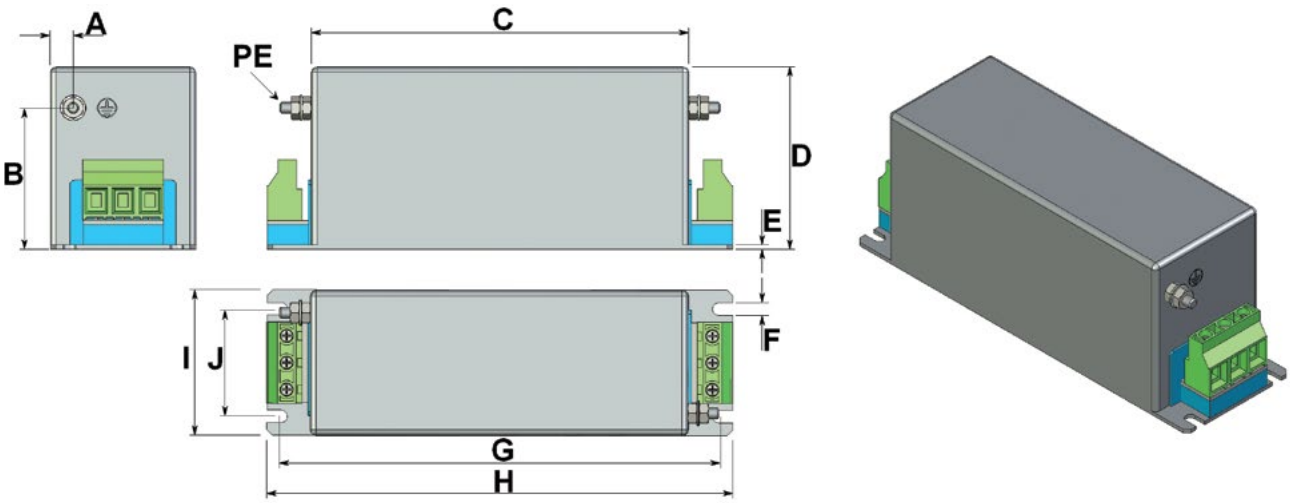


Figure 8.18: *Typical circuit of the external RFI filter*

Data:

Code	Voltage	Frequency	Current	I leak (typical)	Max. Cable	Torque
10189830	520/300 Vac	50/60 Hz	8 A	13 mA	4 mm² 10 AWG	0.6 N.m (connector)
						1.4 N.m (PE)
10189831	520/300 Vac	50/60 Hz	16 A	15 mA	4 mm² 10 AWG	0.6 N.m (connector)
						1.4 N.m (PE)
10189834	520/300 Vac	50/60 Hz	50 A	15 mA	10 mm² 6 AWG	1.5 N.m (connector)
						4.8 N.m (PE)
10189835	520/300 Vac	50/60 Hz	66 A	16 mA	16 mm² 4 AWG	1.8 N.m (connector)
						4.8 N.m (PE)

Dimensions:



Code	A	B	C	D	E	F	G	H	I	J	PE	Weight
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm	kg (lb)
10189830	8.0 (0.31)	50.0 (1.97)	133.7 (5.26)	63.0 (2.48)	1.5 (0.06)	4.5 (0.18)	155.0 (6.10)	165.0 (6.50)	51.4 (2.02)	38.0 (1.50)	M4x11	0.58 (1.28)
10189831	9.0 (0.35)	60.0 (2.36)	199.5 (7.85)	70.0 (2.76)	1.5 (0.06)	4.5 (0.18)	221.0 (8.70)	231.0 (9.09)	46.4 (1.83)	38.0 (1.50)	M5x15	0.90 (1.98)
10189834	8.0 (0.31)	70.0 (2.76)	200.0 (7.87)	90.0 (3.54)	1.5 (0.06)	4.5 (0.18)	255.0 (10.04)	265.0 (10.43)	58.0 (2.28)	35.0 (1.38)	M6x24	1.75 (3.86)
10189835	8.0 (0.31)	120.0 (4.72)	200.0 (7.87)	141.5 (5.57)	1.5 (0.06)	4.5 (0.18)	255.0 (10.04)	265.0 (10.43)	58.0 (2.28)	35.0 (1.38)	M6x24	2.70 (5.95)

Figure 8.19: *Dimensions of the external RFI filter*

8.3.5 Autotransformer

They are applied when the power supply voltage is different from the value of the rated voltage of the SCA06.

NOTE!
As it is an autotransformer, there is no galvanic insulation of the power supply.

Dimensioning:

$$P_{transf} = \text{Current}_{Io} \cdot \text{Voltage}_{SCA06} \cdot \sqrt{3} \cdot 1.10$$

Where:
P_{transf}: Autotransformer power.
Current_{Io}: Servomotor current, value found in Table 8.2 on page 8-10 (Technical data of the servomotors).

$Voltage_{SCA06}$: Rated voltage of the SCA06.

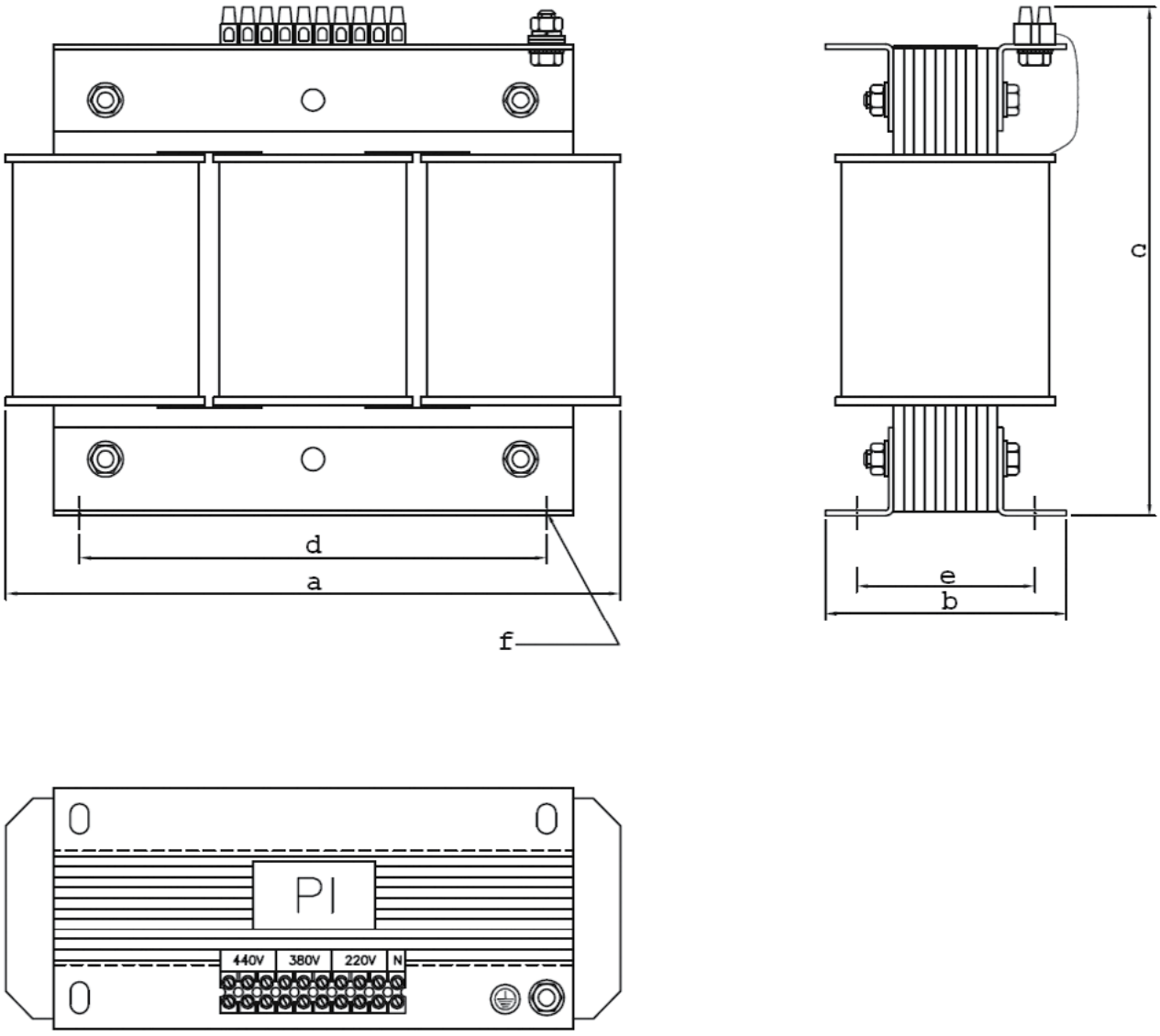
When one autotransformer supplies several servo drives, the autotransformer must be dimensioned by adding the powers calculated for each SCA06, and, depending on the cycle type, you can apply a use factor, whose minimum value is 0.7 for distinct cycles and maximum value is 1 for shafts in synchronism (equal cycles).

$$P_{Total} = (P_{transf1} + P_{transf2} + P_{transfn}) \cdot uf$$

WEG offers several models of autotransformers, as you can see below.

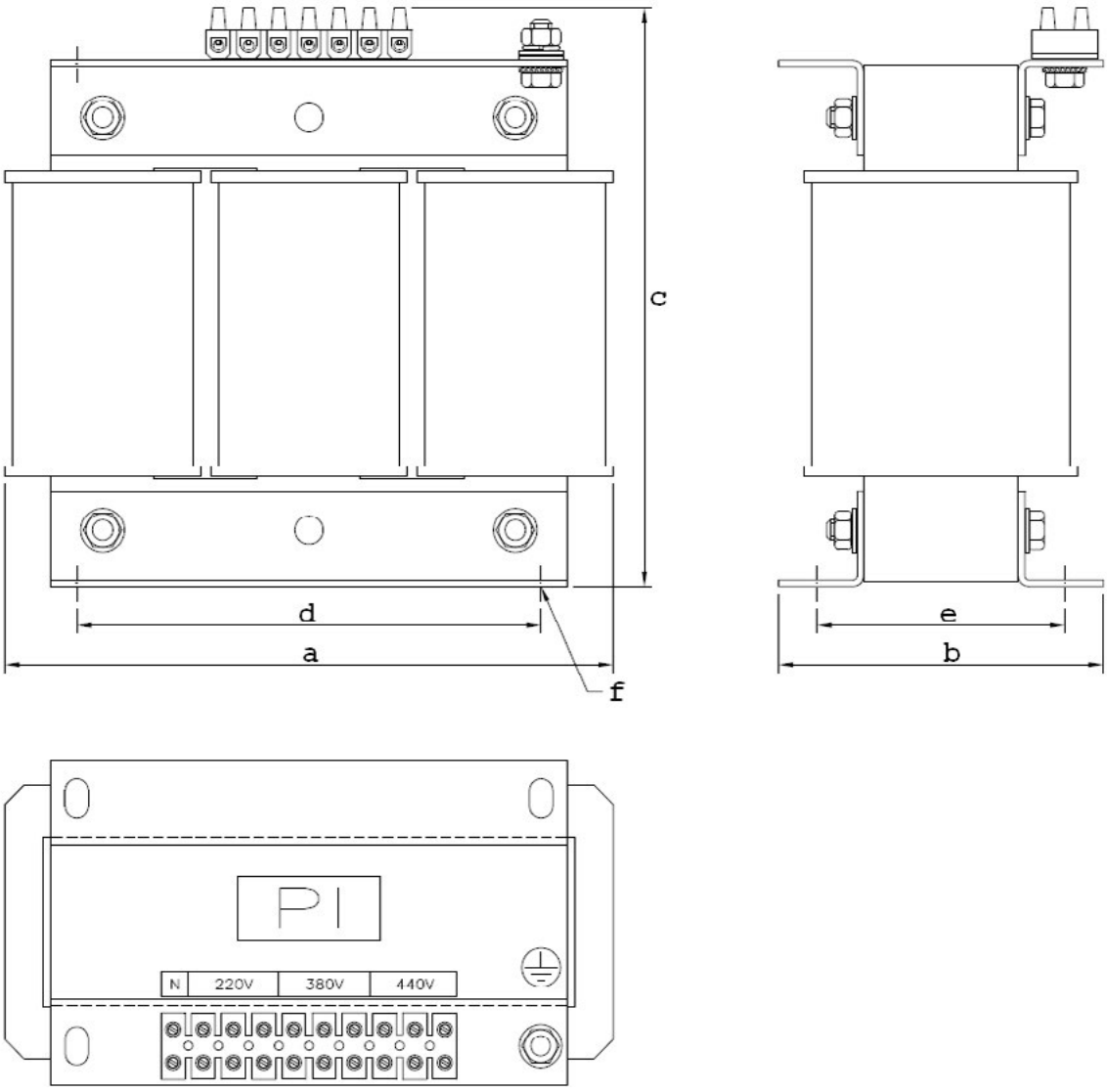
In case an autotransformer of other suppliers is used, note that it must not cause a voltage drop greater than 3 %, since that would increase the supply variation margin (-15 % to +10 %).

General Data:	
Type:	Dry three-phase autotransformer
Output power:	As per Figure 8.20 on page 8-30 to Figure 8.23 on page 8-33
Efficiency:	95 %
Supply voltages:	220 / 380 / 440 V
Internal connection:	Star with accessible neutral
Protection degree:	IP00, without protection Box
Insulation class:	0.6 kV
Insulation voltage (dielectric):	4 kV
Temperature class:	B 130 °C (266 °F)
Temperature rise:	B 80 °C (176 °F)
Operating frequency:	50 / 60 Hz



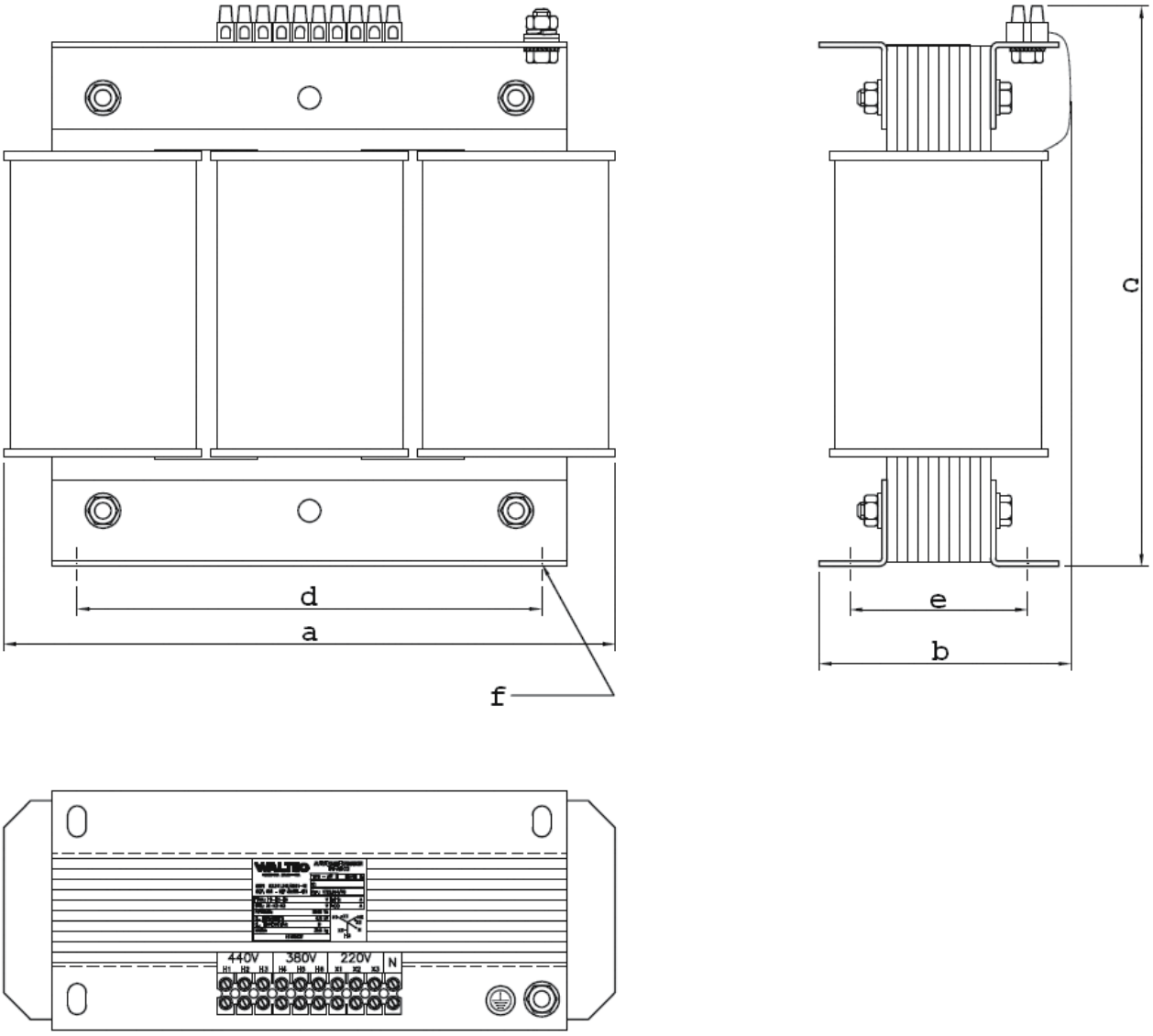
Code	Power (kVA)	Dimensions mm (in)						Weight kg (lb)
		a	b	c	d	e	f	
10190833	1	217 [max.] (8.54) [max.]	120 [max.] (4.72) [max.]	140 [max.] (5.51) [max.]	199 [±1] (7.83) [±0.04]	82 [±2] (3.23) [±0.08]	6 x 9 [±0.5] (0.24 x 0.35) [±0.02]	8.9 (19.62)
10190834	1.5	215 [max.] (8.46) [max.]	140 [max.] (5.51) [max.]	155 [max.] (6.10) [max.]	199 [±1] (7.83) [±0.04]	111 [±2] (4.37) [±0.08]	6 x 9 [±0.5] (0.24 x 0.35) [±0.02]	12.4 (27.34)
10190835	2	240 [max.] (9.45) [max.]	140 [max.] (5.51) [max.]	230 [max.] (9.06) [max.]	180 [±1] (7.09) [±0.04]	86 [±2] (3.39) [±0.08]	9 x 15 [±0.5] (0.35 x 0.59) [±0.02]	18 (39.68)

Figure 8.20: *Dimensions of the autotransformers of 1, 1.5 and 2 kVA*



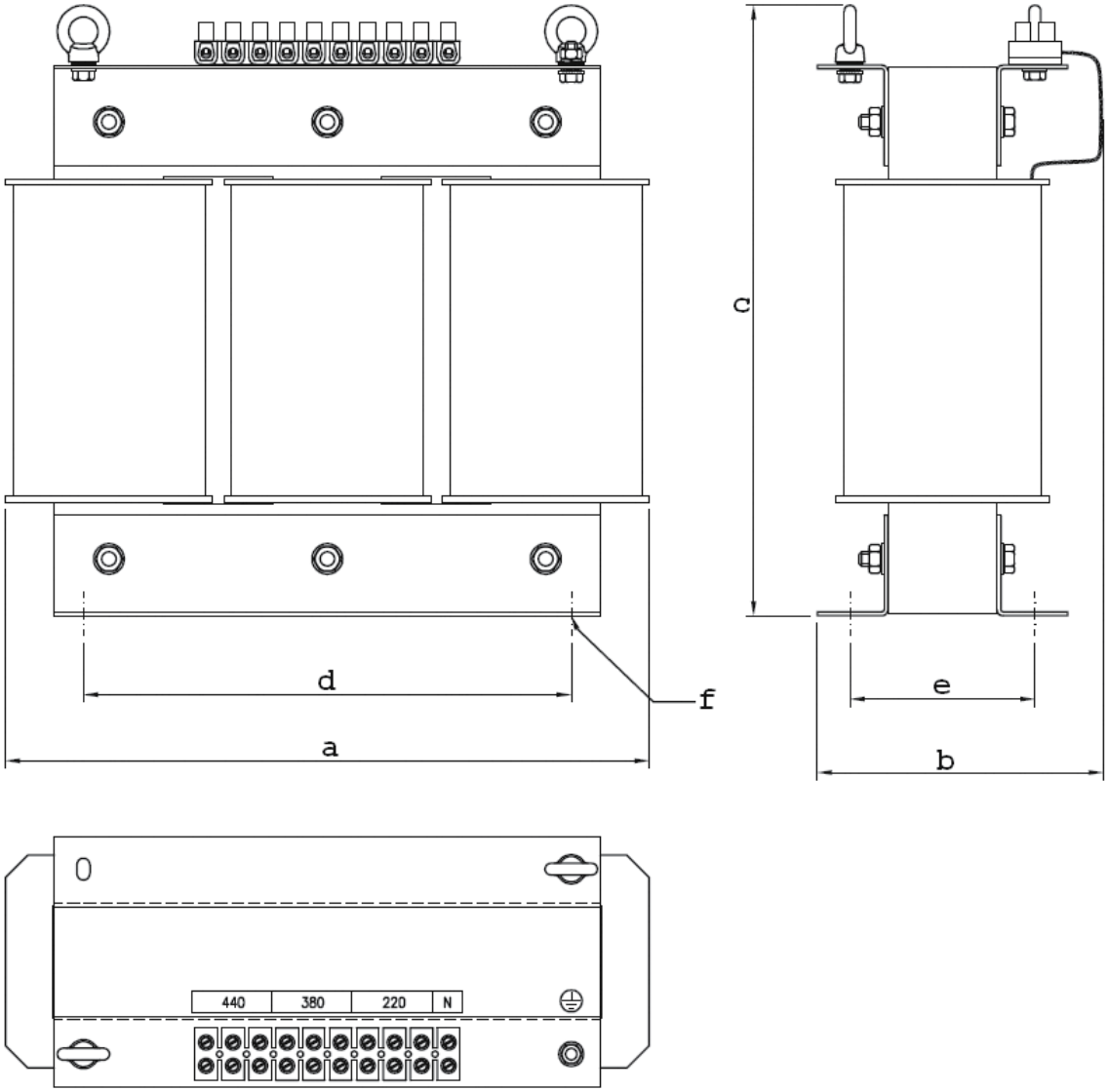
Code	Power	Dimensions						Weight
	(kVA)	mm (in)						kg (lb)
		a	b	c	d	e	f	
10190836	3	240 [max.] (9.45) [max.]	160 [max.] (6.30) [max.]	230 [max.] (9.06) [max.]	180 [±1] (7.09) [±0.04]	96 [±2] (3.78) [±0.08]	9 x 15 [±0.5] (0.35 x 0.59) [±0.02]	21 (46.30)

Figure 8.21: *Dimensions of the autotransformer of 3 kVA*



Code	Power	Dimensions						Weight
	(kVA)	mm (in)						kg (lb)
		a	b	c	d	e	f	
10190837	5	300 [max.] (11.81) [max.]	150[max.] (5.91) [max.]	285 [max.] (11.22) [max.]	225 [±1] (8.86) [±0.04]	86 [±2] (3.39) [±0.08]	9 x 15 [±0.5] (0.35 x 0.59) [±0.02]	30.5 (67.24)

Figure 8.22: *Dimensions of the autotransformer of 5 kVA*



Code	Power	Dimensions						Weight
	(kVA)	mm (in)						kg (lb)
		a	b	c	d	e	f	
10190838	7.5	300 [max.] (11.81) [max.]	200 [max.] (7.87) [max.]	310 [max.] (12.20) [max.]	225 [±1] (8.86) [±0.04]	136 [±2] (5.35) [±0.08]	9 x 15 [±0.5] (0.35 x 0.59) [±0.02]	51 (112.44)
10190839	10	360 [max.] (14.17) [max.]	200 [max.] (7.87) [max.]	360 [max.] (14.17) [max.]	270 [±1] (10.63) [±0.04]	117 [±2] (4.61) [±0.08]	9 x 15 [±0.5] (0.35 x 0.59) [±0.02]	65 (143.30)

Figure 8.23: *Dimensions of the autotransformers of 7.5 and 10 kVA*

9 TECHNICAL SPECIFICATIONS

This chapter describes the technical specifications (electrical and mechanical) of the SCA06 servo drive line.

9.1 POWER DATA

Power Supply:

- Tolerance: -15 % to +10 %.
- Frequency: 50/60 Hz (48 Hz to 62 Hz).
- Phase imbalance: ≤ 3 % of the rated phase-to-phase input voltage.
- Overvoltage according to Category III (EM 61010/UL 508C).
- Transient voltages according to Category III.
- Maximum of 60 connections per hour.
- Typical efficiency: ≥ 96 %.
- Typical input power factor:
  0.94 for models with three-phase input in the rated condition.
  0.70 for models with single-phase input in the rated condition.

Table 9.1: *Technical specifications for SCA06 line*

Model	Mechanics	Supply Single (1ϕ) or Three-phase (3ϕ)	Voltage Vac	Rated Output Current Arms (1)	Overload Current Arms/s	Rated Switching Frequency kHz	Rated Input Current Arms	Dissipated Power W (2)	Ambient Temperature Around the Servo Drive	Weight		Cabinet Protection Degree	RFI Suppressor Filter	Safety Stop	Incorporated Electronics Supply (no need of external 24 Vdc supply)
										kg	lb				
SCA06B05P0D2	B	1ϕ	220...230	4	8 A / 3 s	10	10	98	0 ... 50 °C (32...122 °F)	1.56	3.44	IP20	Yes	Yes (*)	Yes
		3ϕ		5	8 A / 5 s		6.1	60							
SCA06C08P0T2	C	3ϕ		8	16 A / 3 s		10	120		1.92	4.23				
SCA06D16P0T2	D			16	32 A / 3 s		20	400		3.70	8.16				
SCA06D24P0T2	D			24	48 A / 3 s		30	700		3.70	8.16				
SCA06C05P3T4	C		380...480	5.3	8 A / 3 s		6.5	135		1.92	4.23				
SCA06D14P0T4	D			14	28 A / 3 s		17	500		3.70	8.16				
SCA06E30P0T4	E			30	60 A / 3 s		37.5	700		20.5	45.2				

(*) Available soon, as optional item.

Note:

(1) Rated current in permanent duty in the following conditions:
- Ambient temperature around the servo drive: 0 °C to 50 °C (32...122 °F). The servo drive can operate in environments with ambient temperature around the servo drive up to 60 °C (140 °F) if a 2 % output current reduction is applied for each °C above 50 °C (122 °F).
- Air relative humidity: 5 % to 90 % non-condensing.
- Altitude: 1000 m (3280.8 ft). Above 1000 m (3280.8 ft) up to 4000 m (13123.3 ft) the output current must be reduced 1 % for each 100 m (328.1 ft) above 1000 m (3280.8 ft).
- Environment with pollution degree 2 (as per EN50178 and UL508C).

(2) The specified losses are valid for rated operating conditions, that is, for rated output current and switching frequency.

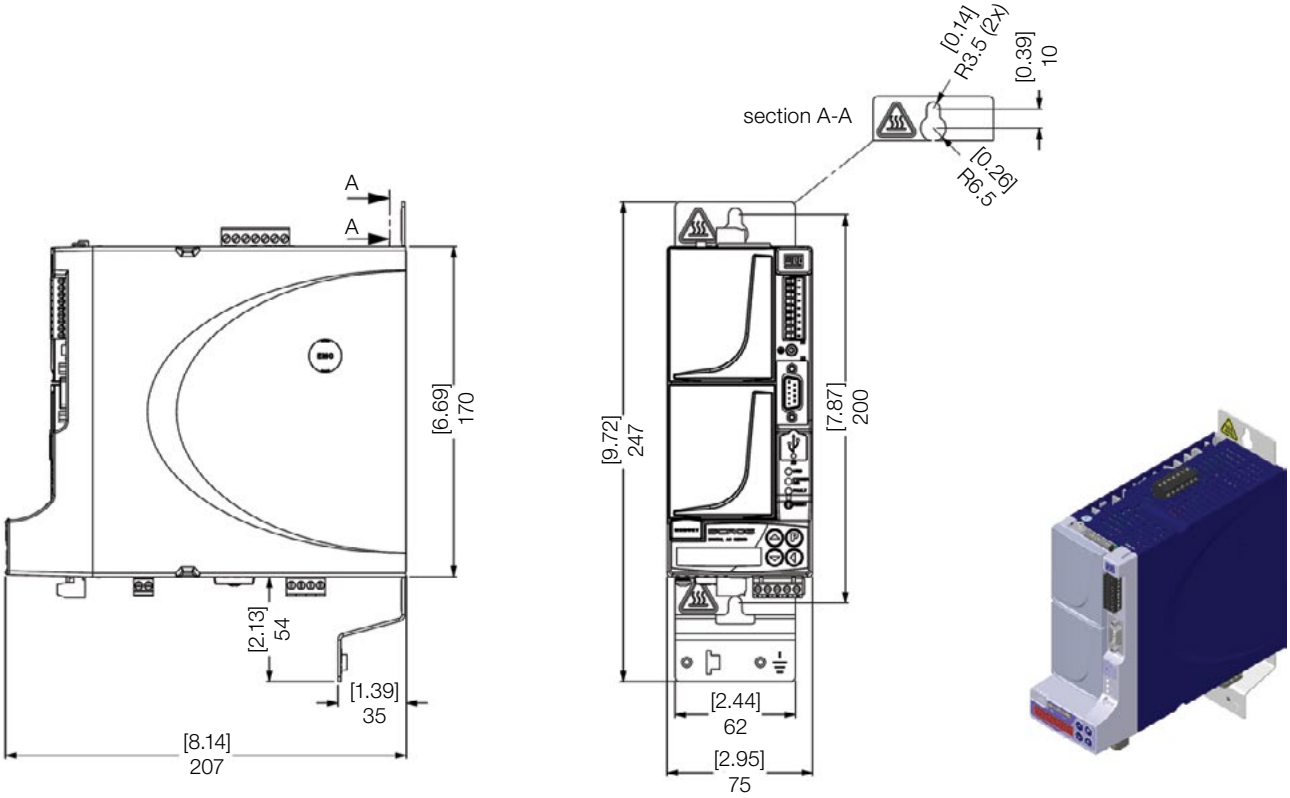
9.2 ELECTRONICS/GENERAL DATA

CONTROL	SUPPLY	Voltage: 24 Vdc, -15 %, +20 %
		Current: 1 A (models SCA06B05PD2 and SCA06C08P0T2) 2 A (other models)
	METHOD	Vector control with feedback
		PWM 10 kHz
		Current, flow, speed and position digital regulators
		Current regulators: 100 µs (10 kHz)
		Flow regulator: 100 µs (10 kHz)
		Speed regulator / speed measurement: 100 µs (10 kHz)
	OUTPUT FREQUENCY	0 to 400 Hz
INPUTS	ANALOG	1 signal differential input: -10 to +10 V, resolution: 12 bits Vmax: ±14 V, Impedance: 400 kΩ, programmable functions
	DIGITAL	2 isolated digital inputs Programmable functions High level: ≥ 18 V Low level: ≤ 3 V Max. voltage 30 V Input current: 3,7 mA @ 24 Vdc Maximum frequency: 500 kHz
		1 isolated digital input Programmable functions High level: ≥ 18 V Low level: ≤ 3 V Max. voltage: 30 V Input current: 11 mA @ 24 Vdc Maximum delay time: Leading edge = 10 µs Falling edge = 50 µs
OUTPUT	RELAY	1 relay output Programmable functions NA contact Vmax: 240 Vac 200 Vdc Imax.: 0.5 A
SAFETY	PROTECTION	Overcurrent / Short circuit in the output
		Undervoltage / Overvoltage in the power
		Undervoltage / Overvoltage in the electronics supply
		Over temperature
		Overload on the motor
		External alarm / fault
		Phase short-circuit phase – ground in the output
HUMAN - MACHINE INTERFACE (HMI)	STANDARD HMI	4 keys: Parameter, Increase, Decrease and Shift LED display, 6 digits It allows access / modification of all parameters LEDs for indication of “Power on”, “Fault” and USB communication
PC CONNECTION FOR PROGRAMMING	USB CONNECTOR	Standard USB Ver. 2.0 (basic speed)
		USB plug type B device
		Interconnection cable: standard host / device shielded USB cable

9.2.1 Standards Met

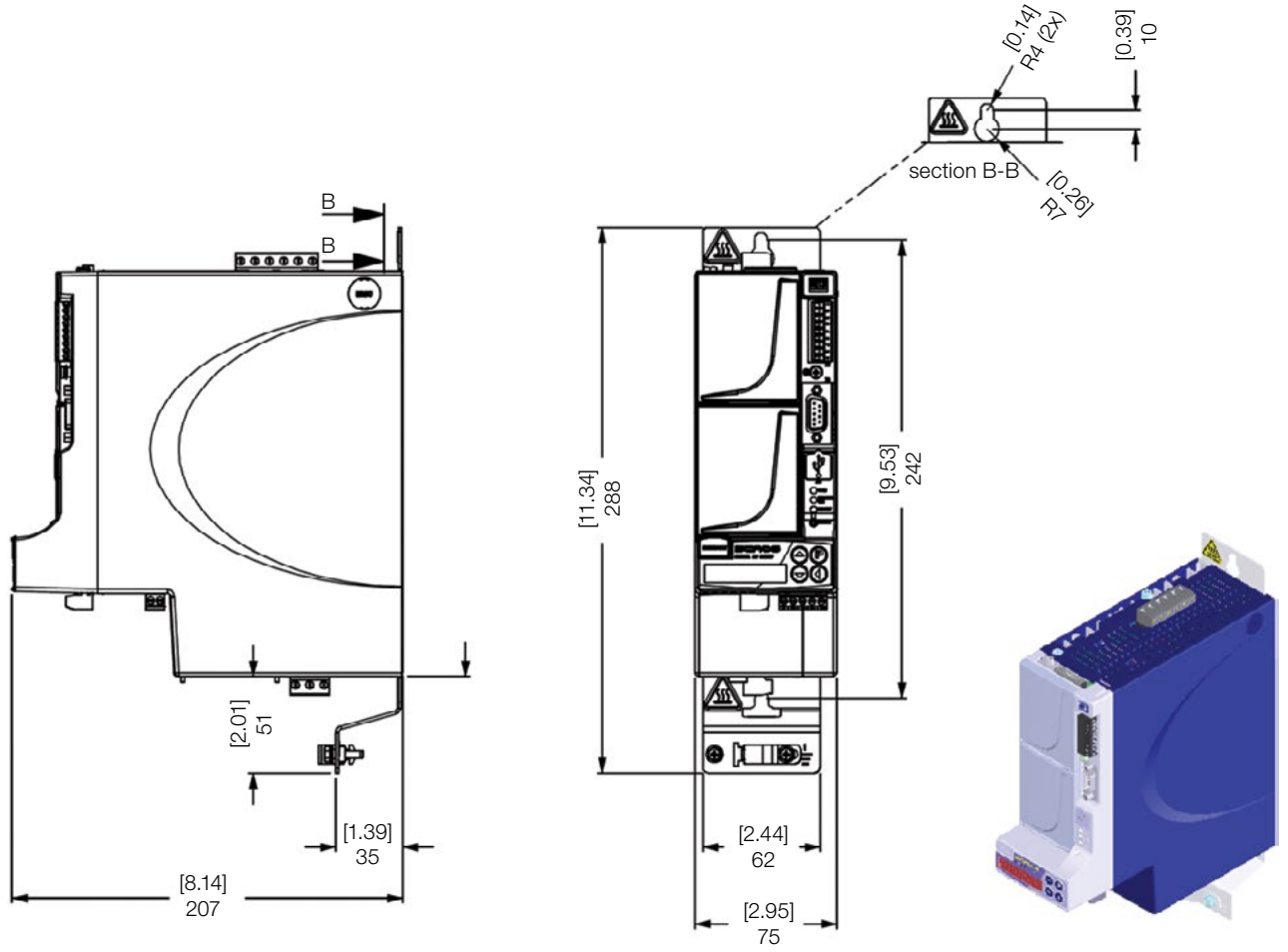
SAFETY STANDARDS	UL 508C - Power conversion equipment
	UL 840 - Insulation coordination including clearances and creepage distances for electrical equipment
	EN61800-5-1 - Safety requirements electrical, thermal and energy
	EN 50178 - Electronic equipment for use in power installations
	EN 60204-1 - Safety of machinery. Electrical equipment of machines. Part 1: General requirements **Note:** In order to have a machine in compliance with this standard, the machine manufacturer is responsible for the installation of an emergency stop device and a circuit breaker to disconnect the machine from the power supply
	EN 60146 (IEC 146) - Semiconductor converters
	EN 61800-2 - Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency AC power drive systems
ELECTROMAGNETIC COMPATIBILITY STANDARDS (EMC)	EN 61800-3 - Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods
	EN 55011 - Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment
	CISPR 11 - Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics - Limits and methods of measurement
	EN 61000-4-2 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test
	EN 61000-4-3 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test
	EN 61000-4-4 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test
	EN 61000-4-5 - Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test
	EN 61000-4-6 - Electromagnetic compatibility (EMC)- Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
MECHANICAL CONSTRUCTION STANDARDS	EN 60529 - Degrees of protection provided by enclosures (IP code)
	UL 50 - Enclosures for electrical equipment

9.3 MECHANICAL DATA



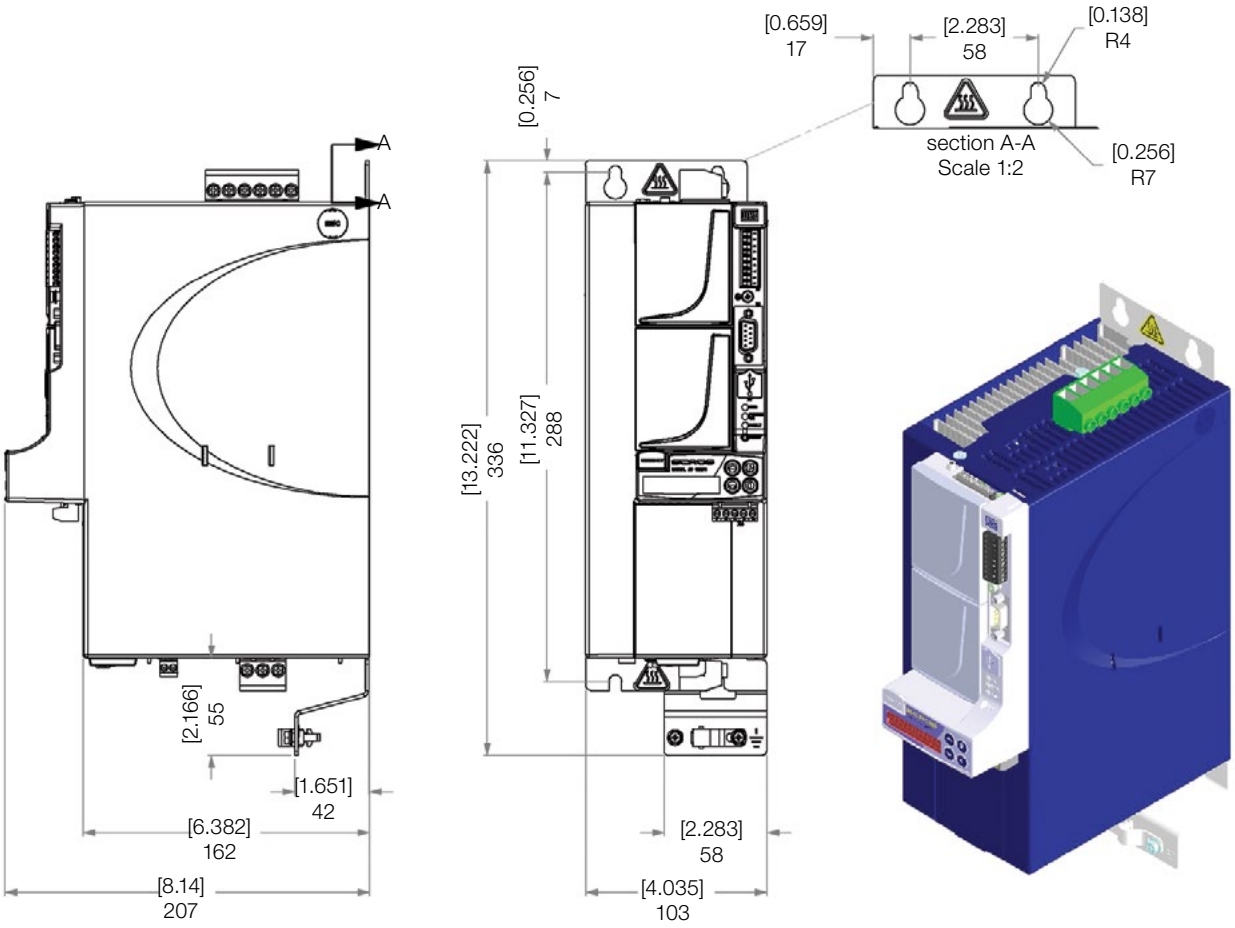
* Dimensions in m [in]

Figure 9.1: *Dimensions of the servo drive – Frame size B*



* Dimensions in m [in]

Figure 9.2: *Dimensions of the servo drive – Frame size C*



* Dimensions in m [in]

Figure 9.3: *Dimensions of the servo drive – Frame size D*

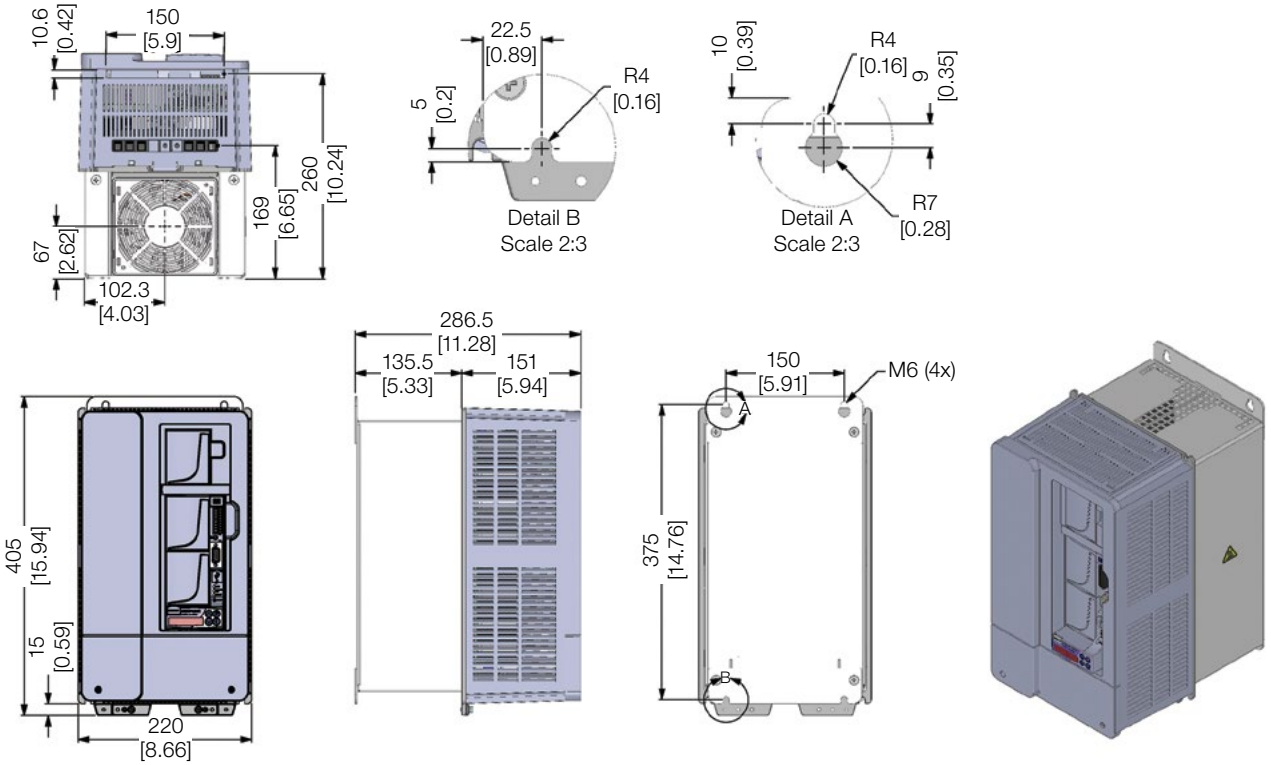


Figure 9.4: *Dimensions of the servo drive – Frame size E*